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FIRST BIENNIAL REPORT

Department of Wild Life and Fisheries

State of Louisiana

1944 1945

First Biennial Report

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DEPARTMENT of WILD LIFE and FISHERIES

STATE OF LOUISIANA

1944 - 1945

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Edited and compiled by
Isaac D. Chapman, Director
Education and Publicity Division.

Enactment of a Louisiana Constitutional Amendment in November, 1944, provided for the separation of the fish and game and forestry resources from the former Department of Conservation, and for the creation of a new Louisiana Department of Wild Life and Fisheries and a new Louisiana Forestry Commission. The Department of Conservation was re-created, retaining its name, but limiting its supervision to oil, gas and other minerals. The last biennial report of the former Department of Conservation (for the years 1942-43), which contained activities of many divisions now operating under new names and separate Departments, was Number 16. The Department of Conservation will continue the succession of numbers and their Report for this biennium will be Number 17. This is the *first* biennial report of the new Department of Wild Life and Fisheries, and the Louisiana Forestry Commission has also issued a separate account of its activities, called its *first* Progress Report.

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PERSONNEL

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STATE OF LOUISIANA

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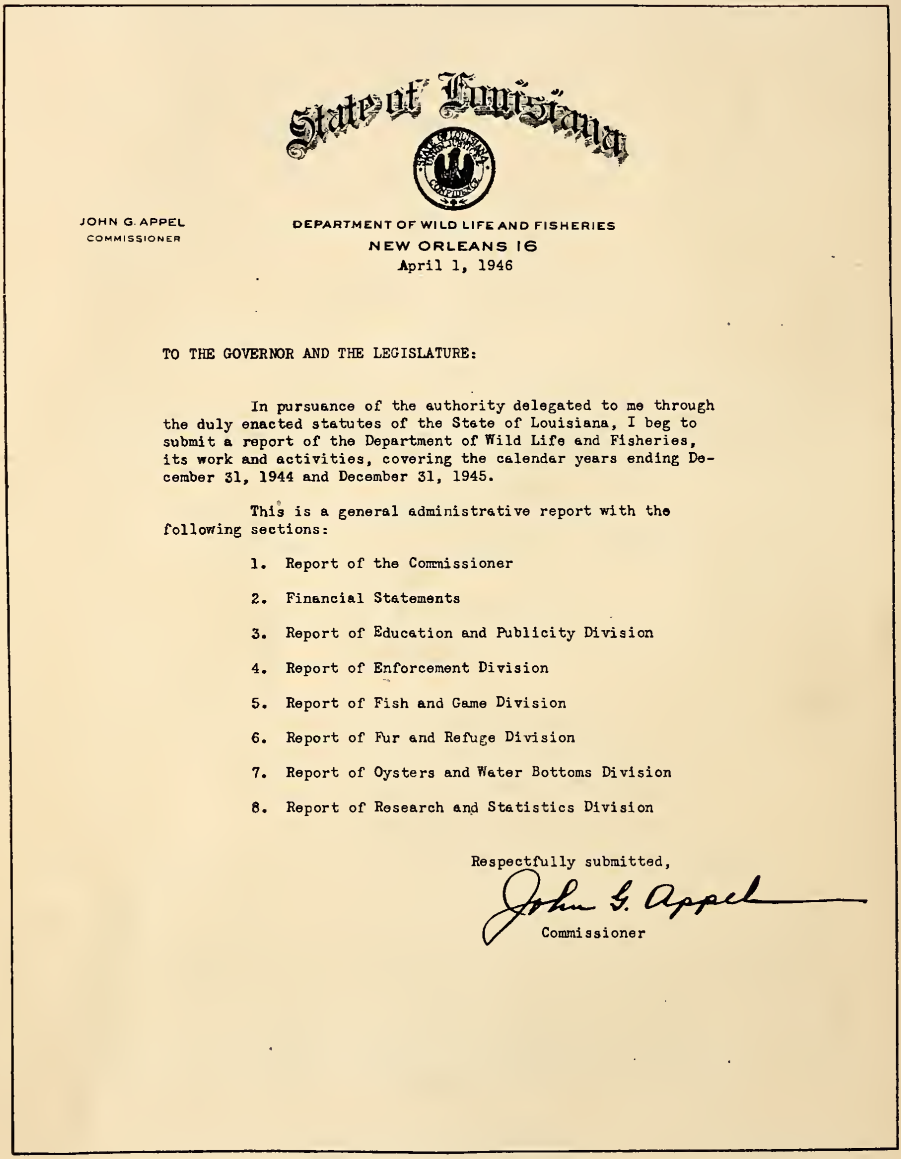
LETTER OF TRANSMITTAL



State of Louisiana

JOHN G. APPEL
COMMISSIONER

DEPARTMENT OF WILD LIFE AND FISHERIES
NEW ORLEANS 16

April 1, 1946

TO THE GOVERNOR AND THE LEGISLATURE:

In pursuance of the authority delegated to me through the duly enacted statutes of the State of Louisiana, I beg to submit a report of the Department of Wild Life and Fisheries, its work and activities, covering the calendar years ending December 31, 1944 and December 31, 1945.

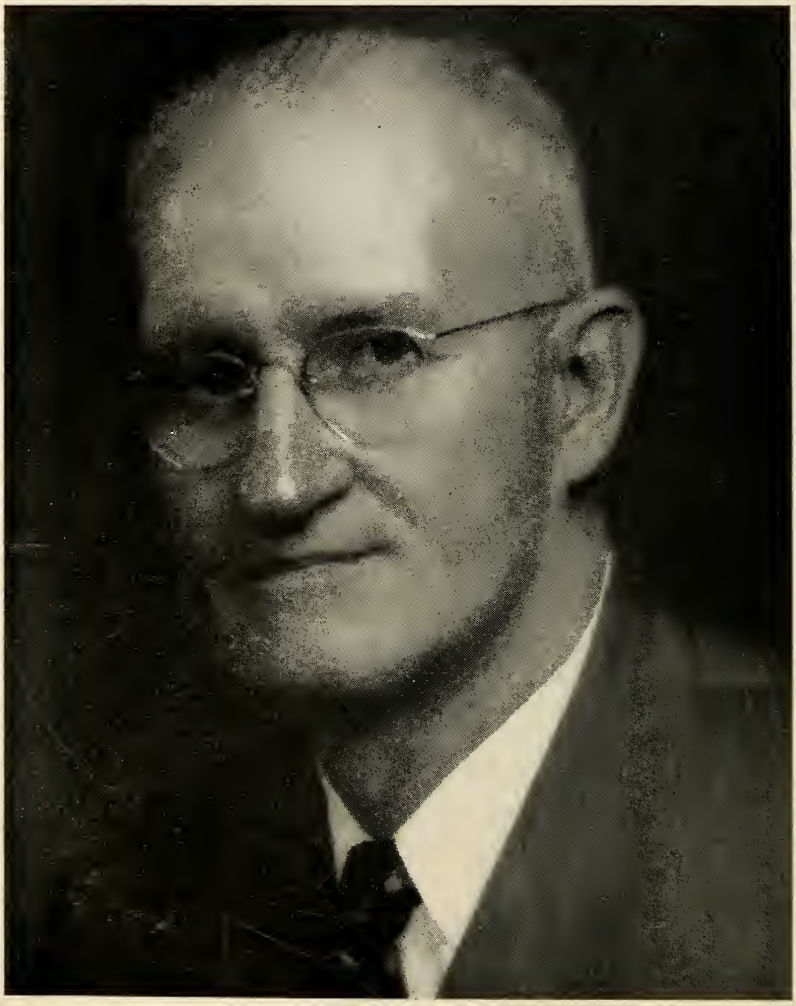
This is a general administrative report with the following sections:

1. Report of the Commissioner
2. Financial Statements
3. Report of Education and Publicity Division
4. Report of Enforcement Division
5. Report of Fish and Game Division
6. Report of Fur and Refuge Division
7. Report of Oysters and Water Bottoms Division
8. Report of Research and Statistics Division

Respectfully submitted,

John G. Appel
Commissioner

Governor Jimmie H. Davis and view of Louisiana's beautiful State Capitol.



John G. Appel, Commissioner, Department of Wild Life and Fisheries.

REPORT OF THE COMMISSIONER

New Orleans, La.
April 1, 1946.

This is the first biennial report of the new State Department of Wild Life and Fisheries which was officially created on December 11, 1944, with the appointment of a Commissioner by Governor Jimmie H. Davis, in accordance with the terms of a Constitutional Amendment approved by the people of Louisiana at the general election in November of 1944.

Sponsored by Governor Davis and his Administration, the Amendment to the State's Constitution to make three separate and independent state departments out of the former Department of Conservation was introduced in the Senate during the biennial session of 1944 and became Senate Bill No. 91. It was approved in the Legislature by big majorities and became Act No. 328 of 1944, and was approved at the polls on November 7, 1944, by a majority of 39,739 votes.

Thus the new Department of Wild Life and Fisheries was created, charged with the responsibility of protecting, conserving and propagating the wild life of Louisiana, including wild game and non-game quadrupeds or animals, game, oysters, fish and other aquatic life.

I have served as Commissioner of this Department since its official creation on December 11, 1944, and while this new Department has been in existence only a little less than a year and a half, this Report covers activities for the biennium period of 1944-45 and 1945-46.

The Department of Wild Life and Fisheries has seven divisions, each administered by a Director, responsible to the Commissioner, and each entrusted with responsibility of carrying on certain activities. The divisions are as follows:

1. Administration
2. Education and Publicity
3. Enforcement
4. Fish and Game
5. Fur and Refuge
6. Oysters and Water Bottoms
7. Research and Statistics

The revenues received and collected by the Department of Wild Life and Fisheries for the operating account during the two-year biennium covered by this report have been greater than the appropriation allocated to this Department. The operating account includes all divisions with the exception of the Fur and Refuge Division. This Division has dedicated funds received from sales of furs and royalties and operates out of revenues from these dedicated funds.

Our actual revenues for the fiscal year ending June 30, 1945 which includes severance tax from gravel, sand, shell, oysters and shrimp, and sales of various licenses, such as angling, hunting, trapping, various commercial licenses and miscellaneous, amounted to $701,608.09. Our actual appropriation for the same period including $15,000.00 in state funds for Pittman-Robertson federal wildlife projects amounted to $571,000.00. Not included in this figure is a total of $16,586.84 in federal funds for Pittman-Robertson projects which cannot be counted as appropriation from the state's general fund. This means our total revenue during the fiscal year ending June 30, 1945 has exceeded our appropriation from the state for that period by $130,608.09.

Our revenues and sales of various licenses for the fiscal year ending June 30, 1946 are estimated at $696,465.00, which is a little over $5,000.00 less than the revenues for the first year of the current biennium. It must be remembered that this is just an estimate and a very conservative one. While there will be certain increases in the sales of some of our licenses particularly hunting, angling, and some commercial licenses, we are expecting a decrease in royalties, and also the severance tax from shells which in the fiscal year ending June 30, 1945, amounted to over $13,000.00, has been specifically dedicated to the propagation and development of the oyster industry by Act of the 1944 session of the Legislature and therefore cannot be incuded as revenues collected by the Department for transmittal to the state's general fund.

Our total appropriation from the state for the fiscal year ending June 30, 1946 which includes $15,000.00 as the state's contribution to Pittman-Robertson wildlife restoration projects, amounts to $563,500.00 This does not include $22,970.00 in federal funds for Pittman-Robertson projects nor $62,000.00 for specific urgent projects, such as water hyacinth control and fish rescue, received from Marsh Island mineral lease, neither of which can be counted as appropriation from the state's general fund. Our revenues for the same period (the fiscal year ending June 30, 1946) conservatively estimated at $696,465.00, shows a difference of $132,965 in revenues over appropriation from the state. Total revenues for the two-year biennium ending June 30, 1946, exceeds the appropriation allocated to this Department from the state's general fund by more than $263,000.00.

After months of careful study and planning, we have set up a definite program for the development and expansion of Louisiana's wildlife and fisheries resources, and it is the first time that such a definite and planned program has ever been presented. The program has been given wide publicity, in order to acquaint our citizens with its importance. It has met with widespread approval and received favorable comment from sportsmen and conservationists and also from sources throughout the nation.

The program contemplates the following six important undertakings:

1. Control of the Water Hyacinth affecting approximately 75 percent of the parishes in the State.
    (a) Purchase of at least six new master water hyacinth machines and employment of full

time crews to operate machines. Estimated 8-man crew to each machine.

(b) Continued study and investigation by Department biologists and scientists to discover new chemicals and methods for water hyacinth elimination.

2. Predator Control.

3. Enlarged fish rescue and fish restocking program.
   (a) Purchase of additional aerated fish trucks, seines and equipment.
   (b) Employment of special crews to rescue fish from barrow pits and transfer them to fishing lakes throughout the State.

4. Enlarged program of Wild Life and Fisheries education and public relations.
   (a) Organization of school and youth groups into conservation clubs, lecture and educational services to sportsmen clubs, women groups and other organizations. Enlargement of visual educational services; publication of educational booklets on Louisiana fish (sport and commercial); Fur-bearing animals; Fishing and Hunting Guides.

5. Enlarged enforcement program through employment of additional enforcement officers in areas of State where they are needed, and purchase of new floating equipment to replace a patrol fleet that is outdated and to keep up with expected post-war expansion of Louisiana's commercial fishing industry.

6. Public Shooting Grounds.
   (a) Plans are under way for obtaining large areas of land in various sections of the State to be used for propagation of inland game, such as quail, deer and turkey, and for managed hunting of this game and migratory waterfowl.

As a result of action by Governor Davis in approving the transfer of $62,000.00 from Marsh Island oil leases to the Department's operating account, certain phases of this program have gone into effect. A part of these special funds have been set aside for the purchase of at least one or two new master water hyacinth machines, which are now in the process of being completed. A part of this money has been set aside for the purchase of one large aerated fish truck, completely equipped, to supplement our fish rescue and restocking program. Likewise funds from this transfer have been set aside to make an immediate start on an expanded program of wildlife education and public relations, with special emphasis on the organization of junior wildlife clubs among the school children of the State, which has already gotten under way.

Just how much of our program we will be able to carry out during the next biennium depends, to a large extent, on the funds that are made available.

With the return of some of our better trained men from the services, our Enforcement Division has shown considerable improvement in both efficiency and results. And there also has been a heartening and encouraging improvement in our relations with the judiciary as public opinion in Louisiana seems rapidly swinging toward strict enforcement of its fish and game laws.

During the years 1942-43, there were a total of 1,828 arrests made in Louisiana for conservation violations, with 589 convictions in our courts. During the years 1944-45, the total of arrests increased to 2,604 and the total convictions increased to 827. In view of the fact, however, that the records show a total of 1,713 conservation cases still pending in the courts for the years 1944-45, more improvement in this respect is hoped for.

In 1945 the State Mineral Board leased certain tracts of land on Marsh Island for oil exploration, with half of the funds going to the state for improvement of the preserve and the other half going to the Russell-Sage Foundation, owners of the 79,000-acre preserve. By terms of an agreement with the Russell-Sage Foundation, funds derived from Marsh Island are dedicated first to improvement of this preserve and for the propagation and protection of wildlife resources and any surplus accruing to be used for education and/or public health.

We have set up a long range program for improvement of Marsh Island, with funds from these leases, which we believe is sufficient to make this preserve one of the finest in the entire nation. The long range program for development of Marsh Island includes planting of duck and goose food, repairing of trappers' camps and construction of additional new camps, reworking eight existing water wells and digging of two new additional fresh water wells, patrol boats, barges, and equipment for enforcement and rehabilitation work on the preserve, and repairing and draining areas eaten up by muskrats and geese.

Several Pittman-Robertson research projects, which were curtailed during the war, because of the loss of trained biologists, have been resumed and new projects for the restoration and propagation of our upland game are to be inaugurated during the next biennium. Despite the handicap of lack of trained personnel and other restrictions, the project of restoration of our quail, which has been under way for several years, has shown definite results, with reports from all over the State this year that the quail season has been the most successful in many years.

Detailed reports of activities and accomplishments of the Department of Wild Life and Fisheries are covered in the reports of the various Divisions which follow.

Summing up, I believe it is recognized that despite the fact the new Department of Wild Life and Fisheries has been in existence only a little less than a year and half, that the faith and confidence of Governor Davis, his Administration and the Legislature, as well as all conservationists who spearheaded the movement for a separate State Department to supervise fish and game resources, has been justified, and that a new era of wildlife conservation progress for Louisiana is ahead in the State's gradual reconversion to peace time economy and prosperity.

JOHN G. APPEL,
Commissioner.

DEPARTMENT OF WILD LIFE AND FISHERIES

Financial Statements for the Fiscal Years 1944-1945 and 1945-1946

1. *Operating Account:*
   Means of Financing.
   Analysis of Revenues transmitted to the Louisiana State Treasury.
   Summary of Expenditures of the under mentioned units:
      - Administration
      - Education & Publicity
      - Research & Statistics
      - Enforcement
      - Oysters & Waterbottoms
      - Fish & Game
      - Pittman-Robertson Federal Projects
2. *Fur and Refuge Account:*
   Means of Financing—Dedicated Revenues.
   Analysis of Expenditures.
3. *Oyster Seed Ground Account:*
   Means of Financing—Dedicated Revenue.
   Analysis of Expenditures.
4. *Little River Dam.*
5. *Fur and Refuge—Marsh Island Improvement Fund.*

OPERATING ACCOUNT

	Actual 1944-1945	Estimated 1945-1946
MEANS OF FINANCING:		
State Appropriation other than Pittman - Robertson Federal Projects	$556,000.00	$548,500.00
Sources other than State Appropriation:		
Funds Received from Fur and Refuge — Marsh Island Lease		62,000.00

	Actual 1944-1945	Estimated 1945-1946
Pittman - Robertson Federal Projects:		
State Appropriation	15,000.00	15,000.00
Federal Allotment	16,586.84	22,970.00
	$587,586.84	$648,470.00

	Actual 1944-1945	Estimated 1945-1946
Analysis of Revenues transmitted to Louisiana State Treasury:		
Severance Tax		
Gravel	$ 15.11	$ 100.00
Sand	660.29	800.00
Shell	13,511.21	None
Skins, Hides and Fur	87,672.26	65,000.00
Oysters	23,512.49	22,000.00
Shrimp	65,459.97	60,000.00
Licenses		
Oyster Shop, Resale-Canning	1,730.00	1,700.00
Anglers	48,398.47	50,000.00
Hunting	124,690.62	175,000.00
Hunting Club	410.00	400.00
Fish Net	29,680.00	30,000.00
Fish Dealers and Agents	24,240.00	24,000.00
Oyster Vessel	1,499.00	1,500.00
Oyster Dredging	6,801.00	7,000.00
Shrimp Seine	23,810.00	24,000.00
Freight or Ice Boats Carrying Shrimp	3,070.00	3,000.00
Breeders for Private Bird and Animal Reserves	180.00	150.00
Trappers	17,206.25	20,000.00
Fur Buyers and Dealers	12,950.00	13,000.00
Bedding Ground Rents	19,767.00	20,000.00
Releasing Liens Fees	43.00	40.00

	Actual 1944-1945	Estimated 1945-1946
Seismic Operations (Excess of Income over Agents fees)	1,875.43	1,800.00
Royalties from Mineral Leases	193,051.32	175,000.00
Royalties from Fish Caught in Eagle Lake)	568.78	500.00
Department Reports and Publications	94.64	75.00
Miscellaneous Collections Prior Year	92.36	None
Return of Commissions Unconsumed	176.29	100.00
Dividends from Defunct Banks	442.60	1,300.00
TOTAL	$701,608.09	$696,465.00

ANALYSIS OF EXPENDITURES:
DIVISION OF ADMINISTRATION

Class of Expenditures:		
Salaries Continuing	$ 63,863.59	$ 75,015.00
Salaries, seasonal or temporary	97.00	None
Less, annual leave—employees transferred from other State Departments	178.12	None
Total Personal Services	$ 63,782.47	$ 75,015.00
Advertising	$ 68.07	$ 70.00
Cleaning and waste removal	123.36	100.00
Dues and subscriptions	25.00	100.00
Heat, light, power and water	1,127.27	1,575.00
Insurance	891.85	500.00
Postage and transportation of commodities	1,011.66	1,300.00
Printing, binding, and reproducing	2,875.35	8,500.00
Rents and use of property	198.00	300.00

	Actual 1944-1945	Estimated 1945-1946
Repairing and servicing property	594.11	635.00
Technical and mechanical services	92.33	100.00
Telephone and telegraph	2,828.11	3,300.00
Traveling expenses	4,053.26	7,400.00
Unliquidated encumbrances at 7/31/45	263.24	None
Total Contractual Services	$ 14,151.61	$ 23,880.00
Building supplies	$ 13.07	$ 20.00
Container Deposit	30.45	None
Electrical supplies	49.74	100.00
Food supplies	311.58	300.00
General plant operating supplies	107.18	100.00
Hand tools and minor equipment	3.67	20.00
Janitorial, laundry, and cleaning supplies	74.93	300.00
Lab., hospital, and med., supplies	2.60	10.00
Motor vehicle supplies	259.41	500.00
Office supplies	1,744.70	1,800.00
Repair supplies (equipment)	22.44	100.00
Sales tax—use tax	49.45	50.00
Unliquidated encumbrances at 7/31/45	328.97	None
Total Supplies and Materials	$ 2,998.19	$ 3,300.00
Bounties and rewards	$ 2,512.50	None
Total Special Current Charges	$ 2,512.50	None
Total Ordinary Recurring Expenses	$ 83,444.77	$102,195.00

	Actual 1944-1945	Estimated 1945-1946
Less: Remuneration from Fur and Refuge Account and Forestry Account for overhead assessments and administrative supervision	$ 11,579.01	$ 5,975.00
TOTAL NET	$ 71,865.76	$ 96,220.00
Automotive equipment	$ 1,910.84	$ 1,250.00
Library books and equipment	49.82	100.00
Office furniture and equipment	464.50	150.00
Total Equipment—Capital Outlay	$ 2,425.16	$ 1,500.00
GRAND TOTAL OF EXPENDITURES	$ 74,290.92	$ 97,720.00

ANALYSIS OF EXPENDITURES:
DIVISION OF EDUCATION & PUBLICITY

Class of Expenditures:		
Salaries continuing	$ 13,808.52	$ 16,988.00
Total Personal Services	$ 13,808.52	$ 16,988.00
Cleaning and waste removal	$ 22.99	$ 20.00
Dues and subscriptions	223.65	250.00
Heat, light, power and water	461.59	500.00
Insurance	345.13	350.00
Postage and transportation of commodities	2,176.32	2,000.00
Printing, binding, and reproducing	3,675.99	4,500.00
Rents and use of property	83.12	140.00
Repairing and servicing property	473.58	500.00
Technical and mechanical services	262.94	600.00

	Actual 1944-1945	Estimated 1945-1946
Telephone and telegraph	374.33	650.00
Traveling expenses	575.52	917.00
Unliquidated encumbrances at 7/31/45	2.00	None
Total Contractual Services	$ 8,677.16	$ 10,427.00
Building supplies	$ 9.04	$ 10.00
Education and recreation supplies	710.17	100.00
Electrical supplies	137.13	75.00
General plant operating supplies	31.39	25.00
Hand tools and minor equipment	2.58	5.00
Household supplies	3.22	None
Janitorial, laundry, and cleaning supplies	31.03	50.00
Motor vehicle supplies	387.36	300.00
Office supplies	4.16	20.00
Repair supplies (equipment)	.40	None
Unliquidated encumbrances at 7/31/45	411.00	None
Total Supplies and Materials	$ 1,727.48	$ 585.00
Total Ordinary Recurring Expenses	$ 24,213.16	$ 28,000.00
Education and recreational equipment	$ 388.08	$ 500.00
Office furniture and equipment	64.10	None
Total Equipment — Capital Outlay	$ 452.18	$ 500.00
GRAND TOTAL OF EXPENDITURES	$ 24,665.34	$ 28,500.00

ANALYSIS OF EXPENDITURES:
DIVISION OF RESEARCH AND STATISTICS

	Actual 1944-1945	Estimated 1945-1946
Class of Expenditures:		
Salaries continuing	$ 16,345.36	$ 18,058.00
Fees for professional services	1,644.00	250.00
Annual leave, employees transferred to other State Departments	28.75	None
Total Personal Services	$ 18,018.11	$ 18,308.00
Advertising	$ 4.25	$ 87.00
Dues and subscriptions	12.00	18.00
Insurance	245.19	150.00
Music and entertainment	21.21	None
Postage and transportation of commodities	165.81	194.00
Printing, binding, and reproducing	85.35	433.00
Rents and use of property	26.30	13.00
Repairing and servicing property	366.60	483.00
Technical and mechanical services	None	4.00
Telephone and telegraph	379.71	400.00
Traveling expenses	3,696.04	4,553.00
Unliquidated encumbrances at 7/31/45	206.50	38.00
Total Contractual Services	$ 5,208.96	$ 6,373.00
Clothing supplies	$ 10.40	None
Education and recreation supplies	12.15	7.00
Electrical supplies	4.18	1.00
General plant operating supplies	6.59	5.00

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	Actual 1944-1945	Estimated 1945-1946
Household supplies	4.77	1.00
Janitorial, laundry, and cleaning supplies	9.66	1.00
Lab., hospital, and med., supplies	385.74	797.00
Motor vehicle supplies	153.16	354.00
Office supplies	204.15	600.00
Repair supplies (equipment)	14.16	None
Unliquidated encumbrances at 7/31/45	225.91	54.00
Total Supplies and Materials	$ 1,030.87	$ 1,820.00
Fees, taxes and assessments	$ 3.00	$ 3.00
Joint projects (not State administered)	1,750.00	None
Total Special Current Charges	$ 1,753.00	$ 3.00
Total Ordinary Recurring Expenses	$ 26,010.94	$ 26,504.00
Laboratory, hospital, and medical equipment	$ 1,792.87	$ 1,602.00
Library books and equipment	34.16	None
Office furniture and equipment	36.63	861.00
Unliquidated encumbrances at 7/31/45	....	33.00
Total Equipment—Capital Outlay	$ 1,863.66	$ 2,496.00
GRAND TOTAL OF EXPENDITURES	$ 27,874.60	$ 29,000.00

ANALYSIS OF EXPENDITURES: DIVISION OF ENFORCEMENT

Class of Expenditures:	Actual 1944-1945	Estimated 1945-1946
Salaries continuing	$198,771.14	$215,400.00
Wages of laborers	48.00	100.00
Annual leave, employees transferred to other State Departments	789.34	None
Total Personal Services	$199,608.48	$215,500.00
Advertising	$ 9.72	$ 20.00
Cleaning and waste removal	154.09	200.00
Heat, light, power and water	354.77	460.00
Insurance	5,569.18	4,000.00
Postage and transportation of commodities	347.57	1,000.00
Printing, binding, and reproducing	376.40	1,000.00
Rents and use of property	2,013.08	2,000.00
Repairing and servicing property	1,501.93	2,000.00
Technical and mechanical services	7.50	40.00
Telephone and telegraph	887.34	1,180.00
Traveling expenses	76,837.59	89,080.00
Unliquidated encumbrances at 7/31/45	132.44	None
Total Contractual Services	$ 88,191.61	$100,980.00

	Actual 1944-1945	Estimated 1945-1946
Building supplies	$ 96.82	$ 400.00
Container Deposits	160.00	None
Education and recreation supplies	1.31	None
Electrical supplies	178.00	400.00
Fire fighting supplies	None	200.00
Feed and forage supplies	31.30	40.00
Food supplies	1,751.83	2,040.00
Fuel (other than motor vehicle)	87.21	100.00
General plant operating supplies	291.47	400.00
Hand tools and minor equipment	1.01	100.00
Household supplies	129.22	100.00
Janitorial, laundry, and cleaning supplies	58.09	100.00
Lab., hospital, and med., supplies	9.78	20.00
Motor vehicle supplies	3,304.68	4,000.00
Office supplies	22.46	100.00
Repair supplies (equipment)	1,320.44	2,000.00
Water, steam, ventilating, and drainage system materials	83.44	None
Unliquidated encumbrances at 7/31/45	360.24	None
Total Supplies and Materials	$ 7,887.30	$ 10,000.00
Fees, taxes and assessments	$ 4.05	
Total Special Current Charges	$ 4.05	None
Total Ordinary Recurring Expenses	$295,691.44	$326,480.00

	Actual 1944-1945	Estimated 1945-1946
Less: Remuneration from the Fur and Refuge Account for expenses involved in patrolling and enforcing Game and Fur laws on State Refuges by Rangers and Agents of this Division	None	$ 24,000.00
TOTAL NET	$295,691.44	$302,480.00
Automotive equipment	$ 3,354.37	$ 2,700.00
General Plant equipment	3,592.77	2,000.00
Household furniture and equipment	207.80	300.00
Refrigerating and air conditioning equipment	95.95	None
Total equipment	$ 7,250.89	$ 5,000.00
Repairs to Docks	$ 2,717.50	None
Total Major Repairs	$ 2,717.50	None
Total Capital Outlay	$ 9,968.39	$ 5,000.00
GRAND TOTAL OF EXPENDITURES	$305,659.83	$307,480.00

ANALYSIS OF EXPENDITURES:

DIVISION OF OYSTERS AND WATER BOTTOMS

Class of Expenditures:	Actual 1944-1945	Estimated 1945-1946
Salaries continuing	$ 24,926.25	$ 28,290.00
Total Personal Services	$ 24,926.25	$ 28,290.00

	Actual 1944-1945	Estimated 1945-1946
Advertising	$ 358.00	$ 300.00
Cleaning and waste removal	30.60	40.00
Insurance	1,713.43	1,500.00
Dues and subscriptions		27.00
Postage and transportation of Commodities	172.89	260.00
Printing, binding, and reproducing	141.42	200.00
Rents and use of property	109.67	100.00
Repairing and servicing property	1,666.93	2,000.00
Technical and mechanical services	2,571.31	550.00
Telephone and telegraph	643.18	1,063.00
Traveling expenses	2,623.02	3,600.00
Unliquidated encumbrances at 7/31/45	233.18	None
Total Contractual Services	$ 10,263.63	$ 9,640.00
Building supplies	$ 76.85	$ 200.00
Container deposit	7.39	None
Electrical supplies	81.36	200.00
Engineering supplies	None	20.00
Fire fighting supplies	5.55	30.00
Food supplies	987.33	800.00
Fuel (other than motor vehicle)	24.65	100.00
General plant operating supplies	111.19	120.00
Hand tools and minor equipment	None	40.00
Household supplies	13.25	40.00
Janitorial, laundry, and cleaning supplies	4.52	20.00

	Actual 1944-1945	Estimated 1945-1946
Lab., hospital, and med., supplies	84.75	80.00
Motor vehicle supplies	1,665.50	1,500.00
Office supplies	31.63	200.00
Repair supplies (equipment)	493.28	700.00
Road maintenance materials	10.00	10.00
Unliquidated encumbrances by 7/31/45	282.57	....
Total Supplies and Materials	$ 3,879.82	$ 4,060.00
Fees, taxes, and assessments	None	$ 10.00
Total Special Current Charges	None	$ 10.00
Total Ordinary Recurring Expenses	$ 39,069.70	$ 42,000.00
Automotive equipment	$ 2,822.57	$ 500.00
Building and power plant equipment	191.90	None
Educational and recreational equipment	32.32	None
General plant equipment	772.93	None
Office furniture and equipment	None	100.00
Refrigerating and air conditioning equipment	27.50	None
Total equipment	$ 3,847.22	$ 600.00
Unliquidated encumbrances at 7/31/45	$ 65.00	None

	Actual 1944-1945	Estimated 1945-1946
Repairs to, dams, spillways and locks	None	2,000.00
Repairs to buildings	None	200.00
Total major repairs	$ 65.00	$ 2,200.00
Total Capital Outlay	$ 3,912.22	$ 2,800.00
GRAND TOTAL OF EXPENDITURES	$ 42,981.92	$ 44,800.00

ANALYSIS OF EXPENDITURES: DIVISION OF FISH AND GAME

	Actual 1944-1945	Estimated 1945-1946
Class of Expenditures:		
Salaries continuing	$ 37,662.74	$ 46,350.00
Wages of laborers	1,043.39	5,220.00
Fees for professional services	481.23	700.00
Annual leave, employees transferred to other State Departments	140.47	None
Total Personal Services	$ 39,327.83	$ 52,270.00
Cleaning and Waste removal	$ 12.95	$ 65.00
Dues and subscriptions	39.50	160.00
Heat, light, power and water	986.98	1,200.00
Insurance	1,246.22	1,000.00
Music and entertainment	53.00	None
Postage and transportation of commodities	235.74	200.00
Printing, binding, and reproducing	79.83	400.00

	Actual 1944-1945	Estimated 1945-1946
Rents and use of property	79.00	150.00
Repairing and servicing property	1,960.92	2,100.00
Telephone and telegraph	584.10	600.00
Traveling expenses	4,135.30	8,120.00
Unliquidated encumbrances at 7/31/45	105.96	None
Total Contractual Services	$ 9,519.50	$ 13,995.00
Building supplies	$ 431.08	$ 600.00
Education and recreation supplies	67.06	None
Electrical supplies	206.54	60.00
Feed and forage supplies	3,214.29	3,600.00
Food supplies	36.48	None
Fuel (other than motor vehicle)	110.25	None
General plant operating supplies	215.95	300.00
Hand tools and minor equipment	36.69	300.00
Horticultural and farm supplies	103.22	None
Household supplies	15.48	None
Janitorial, laundry, and cleaning supplies	64.45	60.00
Lab., hospital, and med., supplies	33.40	None
Motor vehicle supplies	2,959.40	4,115.00
Office supplies	14.30	None
Police supplies	2.59	None
Repair supplies (equipment)	156.94	300.00

	Actual 1944-1945	Estimated 1945-1946
Road maintenance materials	7.25	None
Water, steam, ventilating, and drainage system materials	119.00	None
Unliquidated encumbrances at 7/31/45	402.62	None
Total Supplies and Materials	$ 8,196.99	$ 9,335.00
Total Ordinary Recurring Expenses	$ 57,044.32	$ 75,600.00
Automotive equipment	None	$ 13,400.00
Building and power plant equipment	$ 145.85	None
General plant equipment	1,216.25	14,000.00
Horticultural and farm equipment	888.50	None
Laboratory, hospital and medical equipment	322.51	None
Library books and equipment	278.02	None
Office furniture and equipment	780.15	None
Total Equipment Capital Outlay	$ 3,631.28	$ 27,400.00
GRAND TOTAL OF EXPENDITURES	$ 60,675.60	$103,000.00

ANALYSIS OF EXPENDITURES: DIVISION OF PITTMAN-ROBERTSON

Class of Expenditures:	Actual 1944-1945	Estimated 1945-1946
Salaries continuing	$ 11,357.19	$ 14,960.00
Wages of Laborers	None	960.00
Fees for professional services	15.00	None
Total Personal Services	$ 11,372.19	$ 15,920.00
Insurance	$ 185.11	$ 200.00
Postage and transportation of commodities	5.30	100.00
Rents and use of property	447.45	325.00
Repairing and servicing property	130.15	240.00
Technical and mechanical services	27.31	None
Telephone and telegraph	165.13	360.00
Traveling expenses	4,718.84	6,703.00
Total Contractual Services	$ 5,679.29	$ 7,928.00
Building supplies	$ 426.62	$ 789.00
Education and recreation supplies	2.06	None
Feed and forage supplies	184.49	2,270.00
General plant operating supplies	216.94	700.00
Hand tools and minor equipment	None	100.00
Horticultural and farm supplies	1,294.98	1,000.00
Lab., hospital, and medc., supplies	None	100.00
Motor vehicle supplies	87.15	1,400.00

	Actual 1944-1945	Estimated 1945-1946
Office supplies	None	20.00
Other supplies	None	200.00
Repair supplies (equipment)	36.83	200.00
Total Supplies and Materials	$ 2,249.07	$ 6,779.00
Total Ordinary Recurring Expenses	$ 19,300.55	$ 30,627.00
Automotive Equipment	$ 1,795.00	None
General plant equipment	1,443.19	None
Laboratory, hospital and med., equipment	57.20	None
Library books and equipment	6.75	None
Total Equipment Capital Outlay	$ 3,302.14	None
GRAND TOTAL OF EXPENDITURES	$ 22,602.69	$ 30,627.00
GRAND TOTAL EXPENDITURES OPERATING ACCT.	$558,750.90	$641,127.00

NOTE: 75% of the Pittman-Robertson Project expenditures are reimbursed by the Federal Government. The 1944-1945 expenditures above in the amount of $22,602.69 less expenditures disallowed by the Federal Government $486.88. 75% thereof Federal Government pro-rata	$ 16,586.84
25% State of Louisiana pro-rata plus the $486.88 disallowed	6,015.85
Total Expenditures above	$ 22,602.69

FUR AND REFUGE ACCOUNT

	Actual 1944-1945	Estimated 1945-1946
MEANS OF FINANCING—		
Dedicated Revenues to the propagation and protection of preserves:		
Sale of Furs	$ 85,572.60	$ 90,000.00
Sale of alligator skins	270.20	400.00
Rentals of unimproved lands —pasture	1,579.00	1,500.00
Pass-a-Loutre Hunting Club fees	392.00	150.00
Dividends from Defunct Banks	259.13	560.00
Game Warden Service	None	2,600.00
TOTAL	$ 88,072.93	$ 95,210.00
ANALYSIS OF EXPENDITURES:		
Class of Expenditures:		
Salaries continuing	$ 64,198.09	$ 65,000.00
Wages of laborers	73.30	None
Total Personal Services	$ 64,271.39	$ 65,000.00
Advertising	$ 3.30	None
Cleaning and waste removal	83.42	$ 75.00
Heat, light, power and water	60.24	60.00
Insurance	4,346.75	2,200.00

	Actual 1944-1945	Estimated 1945-1946
Postage and transporation of commodities	596.30	800.00
Printing, binding and reproducing	151.26	350.00
Rents and use of property	1,029.75	1,500.00
Repairing and servicing property	2,590.29	2,500.00
Telephone and telegraph	561.15	575.00
Traveling expenses	7,597.31	9,000.00
Technical and mechanical services	None	400.00
Total Contractual Services	$ 17,019.77	$ 17,460.00
Building supplies	$ 2,310.64	$ 2,000.00
Comforts and toilet articles	1.01	None
Container Deposits	154.60	None
Electrical supplies	111.28	125.00
Fire fighting supplies	30.19	None
Food supplies	1,764.03	1,700.00
Fuel (other than motor vehicle)	22.17	25.00
General plant operating supplies	803.90	2,000.00
Hand tools and minor equipment	182.93	100.00
Household supplies	710.03	1,000.00
Janitorial, laundry and cleaning supplies	97.57	100.00
Lab., hospital, and med., supplies	41.98	25.00
Metal identification plates and badges	58.52	50.00

	Actual 1944-1945	Estimated 1945-1946
Motor vehicle supplies	2,479.06	2,800.00
Office supplies	29.73	50.00
Repair supplies (equipment)	1,192.23	2,000.00
Road maintenance materials	36.75	125.00
Water, steam, ventilating, and drainage system material	43.53	40.00
Total Supplies and Materials	$ 10,070.15	$ 12,140.00
Fees, taxes and assessments	$ 6,001.75	$ 30,000.00
Joint projects (not state administered)	50,000.00	None
Total Special Current Charges	$ 56,001.75	$ 30,000.00
Total Ordinary Recurring Expenses	$147,363.06	$124,600.00
Automotive equipment	$ 7,480.00	$ 1,000.00
Building and power plant equipment	232.10	600.00
General plant equipment	367.15	3,000.00
Household furniture and equipment	490.86	3,500.00
Office furniture and equipment	355.64	700.00
Livestock	None	525.00
Total Equipment	$ 8,925.75	$ 9,325.00

	Actual 1944-1945	Estimated 1945-1946
Buildings	$ 360.00	$ 55,500.00
Dams, spillways, and locks	None	1,400.00
Total Land and Structures	$ 360.00	$ 56,900.00
Total Capital Outlay	$ 9,285.75	$ 66,225.00
GRAND TOTAL OF EXPENDITURES	$156,648.81	$190,825.00

Cash balance fiscal year ending June 30, 1944	$251,223.93
Revenue fiscal year ending June 30, 1945	88,072.93
	$339,296.86
Expenditures fiscal year ending June 30, 1945	156,648.81
Cash balance June 30, 1945	$182,648.05
Revenue fiscal year ending June 30, 1946—estimated	95,210.00
	$277,858.05
Expenditures fiscal year ending June 30, 1946—estimated	190,825.00
Free balance June 30, 1946—estimated	$ 87,033.05

OYSTER SEED GROUND ACCOUNT

	Actual 1944-1945	Estimated 1945-1946
MEANS OF FINANCING—		
Dedicated Revenue to the establishment of Oyster Seed Grounds and to the planting, propagation, cultivating, policing, preservation and distribution of oysters as set forth in Act No. 227:		
Tax on shells taken from State owned waterbottoms	$ 66,580.27	$ 60,000.00
	$ 66,580.27	$ 60,000.00
ANALYSIS OF EXPENDITURES:		
Class of Expenditures:		
Salaries continuing	$ 1,626.54	$ 7,000.00
Less: Annual leave employees transferred from other State Departments	340.65	None
Total Personal Services	$ 1,285.89	$ 7,000.00
Insurance	$ 14.62	$ 50.00
Postage and transportation of commodities	30.70	50.00
Printing, binding and reproducing	1.01	100.00
Technical and mechanical services	12,919.00	84,500.00
Telephone and telegraph	31.75	120.00
Traveling expenses	1,493.62	5,200.00
Repairing and servicing property	None	100.00
Total Contractual Services	$ 14,490.70	$ 90,120.00

L. S. U.
Library
La. Coll.

	Actual 1944-1945	Estimated 1945-1946
Building supplies	$ 487.06	$ 500.00
Food supplies	20.84	50.00
General plant operating supplies	49.04	100.00
Motor vehicle supplies	94.15	300.00
Office supplies	12.70	500.00
Hand tools and minor equipment	None	25.00
Household supplies	None	25.00
Janitorial, laundry, and cleaning supplies	None	15.00
Lab., hospital, and med., supplies	None	15.00
Total Supplies and Materials	$ 663.79	$ 1,530.00
Total Ordinary Recurring Expenses	$ 16,440.38	$ 98,650.00
General plant equipment	None	$ 175.00
Automotive equipment	None	3,500.00
Total Equipment	None	$ 3,675.00
Repairs to Buildings	None	$ 3,100.00
Total Major Repairs	None	$ 3,100.00
Total Capital Outlay	None	$ 6,775.00
GRAND TOTAL OF EXPENDITURES	$ 16,440.38	$105,425.00

	Actual 1944-1945	Estimated 1945-1946
Revenue fiscal year ending June 30, 1945	$ 66,580.27	
Expenditures fiscal year ending June 30, 1945	16,440.38	
Cash balance June 30, 1945	$ 50,139.89	
Less funds encumbered for contracts to plant 92,424 bbls. of oyster shells covered by service orders Nos. 25461 and 25650. Payment made during fiscal 1945-1946 included in the above analysis	$ 36,125.24	
Free balance June 30, 1945	$ 14,014.65	

LITTLE RIVER DAM—AVOYELLES PARISH

MEANS OF FINANCING:

Special appropriation Act No. 51 of 1944, Section 2, in the amount of $15,000.00 for the construction of a spillway and earth dike to cross Bayou Leaunoir also an earth approach and discharge channel in the same Bayou. Two earth dikes—one across Little River and one across an adjacent slough.

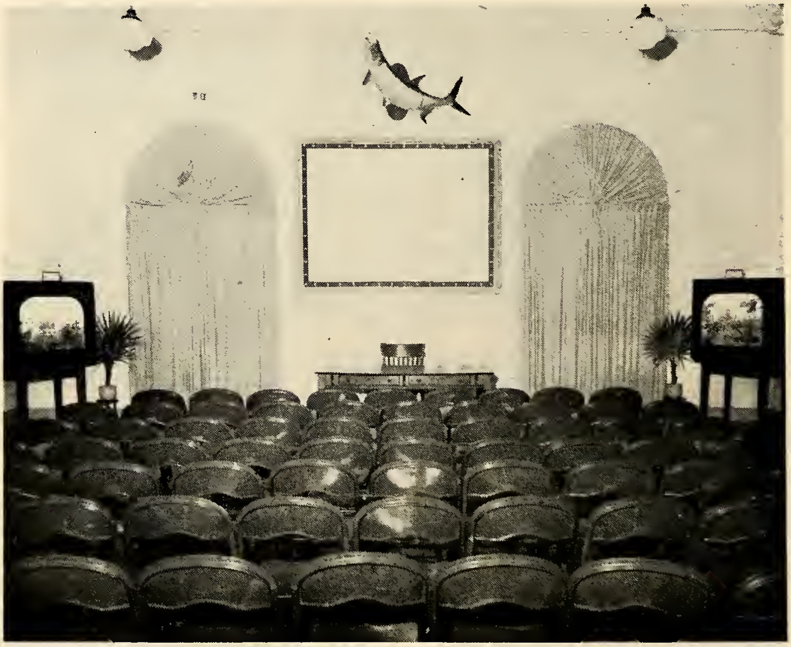
EXPENDITURES, at this time none.

FUR AND REFUGE—MARSH ISLAND IMPROVEMENT FUND

MEANS OF FINANCING:

Funds received from the Russell Sage-Marsh Island Lease in the amount of $114,000.00 to be used only for improvements to the Marsh Island Refuge.

EXPENDITURES, at this time none.



Top photograph shows view of Presbytere Building across from famous Jackson Square in the New Orleans French Quarter, home of the Wildlife Museum operated by the Division of Education and Publicity. Bottom picture shows interior of spacious lecture room in museum where wildlife conservation motion pictures are also shown.

DIVISION OF EDUCATION AND PUBLICITY

Isaac D. Chapman, *Director*

CHAPMAN

Despite handicaps and other restrictions caused by the war, considerable progress has been made during the past biennium in the field of wildlife conservation education and public relations.

The responsibilities, work and purposes of this Division, ties in directly with the other Divisions in the Department, and is an important component part of the Department and of the entire program of protecting, conserving and propagating the State's wildlife and fisheries resources.

It is the responsibility of this Division to "inform" the public of the work of the Department; it is a part of its job to "educate" the people on the importance of the State's game and fish resources; through public relations, through newspapers, magazines, radio, meetings, schools, and other recognized mediums; it is the responsibility of this Division to create and maintain interest in programs and projects pertaining to wildlife conservation.

Thus a favorable public opinion is created, and this is reflected in many ways. The fact that there have been an increasing number of convictions for various fish and game violations, in the courts of our State, is due not only to an alert, active and improved Enforcement Division, but also partly due to mounting public sentiment favoring strict enforcement of the State's fish and game laws and protection of the State's wildlife and fisheries resources.

Advertising, education and public relations, to be effective, must be continuous. This is especially true in the field of wildlife conservation. It is evident to every citizen that there has been created in Louisiana in recent years a new and more favorable public sentiment and interest in the State's wildlife and fisheries resources. And this new renaissance can be attributed largely to effective education and public relations.

To maintain, consolidate and make more effective the gains that have been made in the field of wildlife conservation education, it is essential that these activities be expanded and improved, to provide services for more people and to meet the demands from an increasingly enlightened public.

An expanded program of conservation education and public relations has been carefully worked out and the first phases of it has already gone into effect, with the organization of junior wildlife conservation clubs among school children of Louisiana.

We recognize the importance of creating more interest and providing more educational opportunities for the younger people of our State in our wildlife and fish resources, and the organization of these junior groups, is, we believe a step in that direction. Suggested programs and projects designated to educate the youngsters in wildlife and fisheries subjects and other phases of the conservation program are to be presented to each club.

This new type of junior educational program has met with considerable success and enthusiasm in Kentucky, Missouri, Tennessee and other States. A careful study of the programs in these States were made and considerable time was spent in drawing up plans, programs and projects before the actual organization of clubs got underway. While it is too early to report any result, it is safe to say that this is the first time such a far-reaching and comprehensive program of junior education has ever been undertaken in Louisiana.

WILD LIFE MUSEUM

The Louisiana Department of Wild Life and Fisheries is one of the few state Departments in the nation maintaining and operating a museum of natural resources. This museum is located in the Presbytere Building in New Orleans across from famous Jackson Square. The museum is located in a state-owned building operated by the Louisiana State Museum and its operating expenses have been considerably reduced in recent years.

There are more than 2,500 individual exhibits of wild life and fish in the museum and these are constantly being added to by a staff of two taxidermists and artists.

In the museum a lecture room is available with a seating capacity of over 200. In this room lectures are given and motion pictures on various wildlife conservation subjects are shown to schools and other groups who visit the museum. An average of 5,000 people each month visit this museum and view the exhibits.

EXHIBITS

This Division is assisting in the construction of a migratory waterfowl exhibit at the permanent Louisiana State Exhibit Building in Shreveport operated by the Department of Agriculture. One taxidermist from this Division has been assigned to this work, and when completed, it is expected to be one of the most complete and one of the finest migratory waterfowl exhibits to be found anywhere in the nation.

With the end of the war, and the resumption of various Parish and sectional Fairs during the Fall of 1946, this Division is making plans to furnish wildlife exhibits and participate in as many fairs as will be possible.

PUBLICATIONS

Shortage of paper and other war restrictions have curtailed and practically stopped the publication of educational books during the past four years, with the result that the supply of publications available is at the lowest ebb in many years. Important publications pertaining to Louisiana fish, fur bearing animals, which are constantly in demand, have been out of print for a number of years. It is imperative that these publications be brought up to date and reprinted.

Books on Louisiana's important shrimp industry, a fishing guide for the state, to meet the enormous demand from tourists and Louisiana citizens, are also vitally needed, as well as other educational publications on various phases of Louisiana's wildlife program.

LOUISIANA STATE UNIVERSITY LIBRARY

Some of the migratory waterfowl specimens being prepared for a permanent exhibit in the State Exhibits Building in Shreveport, which when completed, is expected to be one of the finest of its kind in the nation.

The importance of providing these publications cannot be overestimated. Provision for making some of these necessary publications available has been set up in the proposed budget of this Division for the next biennium, which is subject to Legislative approval.

MOTION PICTURE SECTION

A film loan service inaugurated by the Division of Education and Publicity early in 1941 has met with tremendous response and approval throughout the State. The film library is constantly being increased. Some of the motion pictures have been made in Louisiana by a staff photographer of the Department. War restrictions have prevented the making of any new films in Louisiana during the past few years, but many new motion pictures on suitable conservation subjects applying to Louisiana have been purchased.

In 1942, the film library had 16 films on different conservation subjects. Today, we have 42 and several prints of each film is available for simultaneous distribution. These films are loaned to schools, sportsmen clubs and other groups in the State, upon request, free of charge, the only requirement being that transportation be paid both ways for the films and reservations for them be made at least two weeks in advance.

During 1944 and 1945 these films were shown to more than 1200 groups, schools, sportsmen and civic organizations throughout the state.

INFORMING THE PUBLIC

One of the most important factors in the successful outcome of the program of wildlife conservation in Louisiana is that of informing the public as to just what has been done, what is being done, and what is being planned for the future, for the betterment of wild animals, birds, fish, and other resources. Publicizing is the medium by which the people of this state must be informed and educated in the drive to conserve, protect and propagate the state's natural resources.

During the past biennium many thousands of inches of articles and news stories pertaining to the activities of this Department and wildlife conservation in general have appeared in the daily and weekly newspapers in the State. At the same time special feature articles and pictures have appeared in many national sportsmen and conservation magazines throughout the nation.

This Division also acts as a general clearing house for information for the entire Department. Inquiries of almost every type imaginable come in almost every day over the telephone and through the mail. Since the war the amount of mail inquiries from outside the State requesting information on fishing and hunting has increased considerably. Also there are numerous requests from school children during the fall and winter for literature and information on various conservation subjects. This Division has received and answered as many as 300 inquiries in one week.

MONTHLY MAGAZINE

In December, 1942, this Division started the publication of a monthly magazine called the "LOUISIANA CONSERVATIONIST", which is now in its fourth year. It is the official publication of the Department, and has met with wide approval, since it is the medium by which detailed information on Louisiana's wildlife conservation program can be carried to the people, supplementing the fine cooperation given by the newspapers in publishing the most important news articles on these subjects.

The circulation of the "Conservationist" has constantly increased, and it has now a monthly circulation of 14,000, all of which, with few exceptions, is within the State. There is no subscription fee, and the publication is mailed upon

4-H Club boys study oysters. Whenever possible, the Division furnishes instructors and lecturers for Scout camps, teachers short courses, and similar educational programs.

request to anyone interested in Louisiana wildlife conservation. Members of sportsmen clubs, schools, and libraries are among those on the mailing list.

Through competitive bidding, by which a new contract for the printing is awarded each year, the cost of the publication is very small, and a check of the cost of this publication with similar monthly magazines put out by Fish and Game Departments in other states reveals that the cost is less than most of the other states with comparable size publications.

FILM LOAN SERVICE

The following films make up the motion picture library of the Division of Education and Publicity. The title of the films and a short description of each are given below:

(1) FUR ANIMALS OF LOUISIANA—Sound—18 minutes.

Shows methods of trapping and preparing the Louisiana muskrat, mink, 'coon and other fur-bearing animals.

(2) GOING FISHING—Sound—12 minutes.

Methods of taking Louisiana game fish, both fresh and salt water. Exciting scenes of tarpon fishing at the mouth of the Mississippi River.

(3) SALT AND SULPHUR—Sound—20 minutes.

Shows method of mining Louisiana salt, sulphur, and limestone. An educational film designed for use in schools.

(4) WHERE TO NOW—Silent—10 minutes.

An animated cartoon treating on man's abuse of natural resources. Amusing but very educational.

(5) HOW NATURE PROTECTS ANIMALS—Sound—10 minutes.

Shows how nature has protected animals by endowing them with characteristics in keeping with their natural habitat, coloring and other physical characteristics that fit in with their surroundings.

(6) CONSERVATION OF NATURAL RESOURCES —Sound—10 minutes.

Shows vividly our natural resources, how they have been abused, and what conservation agencies are doing now to restore and protect them.

(7) QUAIL HUNTING—Silent—10 minutes—Color.

Louisiana Quail hunting with gun and dogs. Slow motion action shots with tracer shells. Beautiful scenes of dogs pointing and retrieving. Shows proper handling of firearms in the field.

(8) ABC OF FORESTRY—Sound—12 minutes.

Elements of forestry. Includes the growing of seedlings in forest nurseries from the point where the seeds are cultivated, the entire nursery process, through the point where seedlings are taken to the fields and planted. Also shows the value of our forests and their proper use and protection.

(9) PINE WAYS TO PROFIT—Sound—20 minutes.

Shows how land owners and farmers are deriving extra profits from the growth and harvesting of wood products in addition to their regular farm income. The picture vividly illustrates the importance of fire protection in the growth of pine timber.

(10) STOP FOREST FIRES—Sound—10 minutes.

Demonstrates modern methods of fighting forest fires and how to prevent them.

(11) TREE OF LIFE—Sound—20 minutes.

This picture brings out the many ways in which our forest industries are woven into our every day pattern of life. Also emphasizes the importance of forestry protection and wise cutting practices as insurance in the preservation of our timber supply.

(12) OPERATION OF A FOREST NURSERY—Sound —20 minutes.

The operation and management of a forest nursery are shown in this picture. Points out important factors to be considered before nursery sites are selected, cultivation of stock, and how these little trees are then taken from the nursery and planted on barren areas.

(13) STRENGTH OF THE HILLS—Sound—20 minutes.

Forests and vegetation are important in saving the soil from erosion. Shows how man, by wise conservation practices, can derive both profit and pleasure from the land.

(14) THRUSHES AND RELATIVES — Sound — 12 minutes.

The habits of all birds of the thrush family are shown in this entertaining picture.

(15) GROUND WATER—Sound—12 minutes.

The importance of water conservation and its relation to other natural resources are shown in detail.

(16) GRAY SQUIRREL—Sound—12 minutes.

The every day life of a family of gray squirrels is shown in the picture. Designed principally for use in elementary grades.

(17) THE FROG—Sound—15 minutes.

The environment and life cycle of the frog are treated in detail. Close-ups make possible the study of masses of frogs' eggs, the developmental stages of the tadpole, and the breathing mechanisms of the frog's head. Time-lapse scenes reveal the development of the frog from the egg to adult stage in approximately twelve minutes running time.

(18) SUNFISH—Sound—15 minutes.

Environment and life cycle on the Sunfish from the egg to the adult stage. Similar to the film on frogs.

(19) SEA GOING BIRDS—Sound—12 minutes.

Showing gulls, pelicans, and cormorants feeding and nesting. Life cycle of the cliff swallow, building mud nest and feeding young.

(20) THE WHITE PELICAN—Silent—Color—12 minutes.

Showing habitat, feeding and life cycle.

(21) BIRDS OF AN INLAND LAKE—Silent—Color—12 minutes.

Showing habitat, feeding, mating and life cycle.

(22) NATURE'S SONGSTERS — Sound — Color — 12 minutes.

Showing various song birds, their habitat, nests and song. Scenes taken on Avery Island of the heron or egret.

(23) SONG BIRDS OF THE NORTH WOODS—Sound—10 minutes.

A recording of the bird calls and songs taken in their natural habitat, also demonstration of how the sound effects are recorded.

(24) OUR BIRD CITIZENS—Sound—10 minutes.

A portrayal of habits, types and methods of nest building and songs of various birds dwelling near the habitats of man.

(25) HUMMING BIRD—Silent—Color—10 minutes.

An excellent Kodachrome filming of the life cycle of the humming bird taken in its natural habitat.

(26) SWAMPLAND—Sound—10 minutes.

Struggle to live Series: A study of wild animal life found in various swampland districts of the United States that reveals the viciousness and beauty of a primitive nature that rivals the deepest jungles of far off lands.

(27) HERMITS OF CRABLAND—Sound—10 minutes.

Struggle to Live Series: Many different forms of crabs, each distinctive in shape and characteristics, are shown. How this form of marine life exists, protects itself from enemies, feeds itself and raises its young is shown in microscopic detail.

(28) OIL FOR TOMORROW—Sound—30 minutes.

This film, with 250 scenes from 13 of the oil producing states, is beautifully filmed in technicolor. Given its world premiere at the Compact's spring meeting in New Orleans before an overflow audience of state and government officials and representatives of the oil industry, the film was promptly acclaimed the outstanding pictorial achievement of its kind in the nation.

(29) THE LIVING FLOWERS—Sound—12 minutes.

Life cycle of various types of butterflies and moths, with time-lapse exposure showing the development of the insect from the caterpillar stage through the many changes that occur during its life cycle. Microscopic photographs.

(30) THE ADVENTURES OF BUNNY RABBIT—Sound—12 minutes.

This is an entertaining film for primary grade children. It shows the growth of the rabbit in several months, where and how they live, the perils that beset them and then Bunny's adventures when he runs away from home to visit the farm.

(31) BIRDS OF PREY—Sound—12 minutes.

Several common species shown in natural habitats, characteristics, activities of eagles, vulture, hawks, owls, etc.

(32) IRIS FAMILY—Sound—12 minutes.

Evolution of the iris from bulb to bloom.

(33) COMMON ANIMALS OF THE WOODS—Sound —12 minutes.

Aspects of various woods animals: Appearance, habitats, size, methods of protection and care of the young.

(34) FISHING THRILLS—Sound—12 minutes.

Depicting fishing for a variety of game fishes in different waters, methods of fishing.

(35) HOUSING PROBLEM—Silent—12 minutes.

How nature provides shelter for animal world.

(36) BIRD HOMES—Silent—12 minutes.

Types of homes built by some of the common species of birds, methods and materials used, depicts birds at work on homes.

(37) JOLLY FISH—Sound—8 minutes.

A Dick and Larry Cartoon. Good music accompanies this action of two cartoon characters on a fishing trip.

(38) TWO LAME DUCKS—Sound—12 minutes.

Billy Gilbert & Vance Barnett Comedy. Amusing incidents that befall two inexperienced hunters in their quest for ducks.

(39) REPTILES—Silent—12 minutes.

Close ups of reptiles in action, such as snakes, lizards, toads, turtles, alligators, etc.

(40) A MAN, A DOG AND A GUN—Sound—12 minutes.

Hunting scenes showing different breeds of hunting dogs in action and methods of training young dogs.

(41) KINDNESS TO BIRDS—Sound—10 minutes.

Building and placing bird houses; results of kindness to birds. Particularly suitable for elementary grade children.

(42) HOOK, LINE AND MELODY—Sound—12 minutes.

A day's fishing with a singing guide. Anglers and sportsmen's clubs will find this film interesting as well as educational.

Wildlife Agents assisted in rescue and relief work during the Louisiana floods in 1945.

ENFORCEMENT DIVISION

Jos. C. LeBlanc, *Director*

LeBLANC

This report of the Enforcement Division covers the period beginning January 1, 1944, and ending December 31, 1945.

Functions of the Division are the enforcement of all laws protecting the wildlife, seafood and fur-bearing resources of the State of Louisiana. The Division is subdivided in three sections, namely: Director's Office, Waterways Section and Inland Section. Each section has its particular duties to perform.

The Director's Office supervises and coordinates the activities of both Waterways and Inland Sections, and maintains all records of the personnel, equipment, field activities, court cases and dispositions of same. It also maintains pub-

Wildlife Agents at work checking a hunter's bag.

lic relations with individuals or associations interested in the protection of wildlife resources of the State. It inspects all processing plants of the commercial distributors of our seafoods and the refrigeration and storage space of all bird, waterfowl, game and seafood resources of the State.

The Waterways Section is composed of a fleet of large and small boats which are used in patrolling the coastal waters and larger lakes and rivers of the State. In order to maintain this equipment in the best possible repair, a boat wharf with a complete machine and carpenter shop is maintained and is managed by a wharf superintendent and the necessary mechanics, carpenters and watchmen. This patrolling equipment is used in conjunction with our seaplane, which adds greatly to the efficiency of our patrols and the enforcement of the fish and game laws of the State.

Our large boats were borrowed by the Coast Guard shortly after the outbreak of the war and have just been returned to us. These boats are now in the process of being reconditioned and repaired in order to put them in patrolling condition.

The Inland Section is composed of the Wild Life Enforcement Agents assigned to the various parishes and the rangers who operate over the entire State. This section is charged with law enforcement on all inland lakes, streams and woodland, and is divided into six districts. A supervisor is in charge of each district and is responsible for the activities of the agents in his district. The rangers operate under the direct supervision of the Director's Office, functioning wherever necessary in any and all parts of the State and assisting the district supervisors in any way necessary.

Due to the rapid increase of the processing and distributing of our seafood resources, this Division is in need of considerable expansion. In order to properly inspect and supervise this branch of our enforcement work, both personnel and equipment should be greatly increased.

The following report of arrests will reflect a portion of the activities in the enforcement of Wildlife and Fisheries Laws of the State:

		1942-43					1944-45				
PARISH	Judicial District	Convictions	Acquittal	No True Bill	Pending	Total	Convictions	Acquittal	No True Bill	Pending	Total
Caddo	1	19			18	37	27			12	39
Total		19			18	37	27			12	39
Bienville	2	8	1		14	23	8	1		21	30
Claiborne	2	10			14	24	16	2		13	31
Jackson	2	16			9	25	3			16	19
Total		34	1		37	72	27	3		50	80
Lincoln	3	10			3	13	7			6	13
Union	3	15			8	23	7			3	10
Total		25			11	36	14			9	23
Morehouse	4	11			19	30	12	6		20	38
Ouachita	4	36			26	62	23			19	42
Total		47			45	92	35	6		39	80
Franklin	5	1			9	10	11			3	14
Richland	5	5			5	10	4			6	10
West Carroll	5	7			6	13	4	3		3	10
Total		13			20	33	19	3		12	34
East Carroll	6	29			33	62	42	1		6	49
Madison	6	53			60	113	80	2		57	139
Tensas	6	23			30	53	28			11	39
Total		105			123	228	150	3		74	227
Catahoula	7				15	15				36	36
Concordia	7	2			48	50	8			43	51
Total		2			63	65	8			79	87
Caldwell	8	13				13	18	3		7	28
Grant	8	10			4	14	25	3		4	32
La Salle	8	1			3	4	12	1		4	17
Winn	8	3			24	27	0	2		18	20
Total		27			31	58	55	9		33	97
Rapides	9	14			26	40	32	2		34	68
Total		14			26	40	32	2		34	68
Natchitoches	10	47			43	90	33		1	57	91
Red River	10	16			10	26	6	1		10	17
Total		63			53	116	39	1	1	67	108

		1942-43					1944-45				
PARISH	Judicial District	Convictions	Acquittal	No True Bill	Pending	Total	Convictions	Acquittal	No True Bill	Pending	Total
De Soto	11	3	......	......	22	25	3	......	......	8	11
Sabine	11	1	......	......	......	1	1	......	......	11	12
Vernon	11	......	1	......	4	5	31	3	......	5	39
Total		4	1	......	26	31	35	3	......	24	62
Avoyelles	12	16	......	......	26	42	18	......	......	75	93
Total		16	......	......	26	42	18	......	......	75	93
Evangeline	13	4	......	......	16	20	28	......	......	13	41
Total		4	......	......	16	20	28	......	......	13	41
Allen	14	0	......	......	0	0	3	2	......	6	11
Beauregard	14	1	......	......	2	3	4	......	......	7	11
Calcasieu	14	7	......	......	6	13	56	1	......	73	130
Cameron	14	5	......	......	20	25	8	......	......	69	77
Jefferson Davis	14	......	......	......	1	1	19	1	......	16	36
Total		13	......	......	29	42	90	4	......	171	265
Acadia	15	0	......	......	13	13	6	......	......	17	23
Lafayette	15	0	......	......	8	8	4	1	......	8	13
Vermilion	15	15	......	......	22	37	4	3	......	26	33
Total		15	......	......	43	58	14	4	......	51	69
Iberville	16	5	......	......	9	14	2	......	......	4	6
St. Martin	16	3	......	......	15	18	15	1	......	18	34
St. Mary	16	1	......	......	2	3	9	4	......	15	28
Total		9	......	......	26	35	26	5	......	37	68
Lafourche	17	7	......	......	30	37	7	......	......	37	44
Terrebonne	17	17	......	......	18	35	43	3	......	13	59
Total		24	......	......	48	72	50	3	......	50	103
Iberville	18	1	......	......	50	51	3	......	6	33	42
Pointe Coupee	18	2	......	......	25	27	0	......	9	49	58
West Baton Rouge	18	6	......	......	4	10	3	......	......	10	13
Total		9	......	......	79	88	6	......	15	92	113
E. Baton Rouge	19	5	......	......	24	29	18	1	......	20	39
Total		5	......	......	24	29	18	1	......	20	39

		1942-43					1944-45				
PARISH	Judicial District	Convictions	Acquittal	No True Bill	Pending	Total	Convictions	Acquittal	No True Bill	Pending	Total
East Feliciana	20	5	......	......	1	6	......	......	......	1	1
West Feliciana	20	......	......	......	2	2	1	......	......	4	5
Total		5	......	......	3	8	1	......	......	5	6
Livingston	21	5	......	......	28	33	1	......	......	30	31
St. Helena	21	4	......	......	......	4	......	......	......	2	2
Tangipahoa	21	10	......	......	28	38	8	......	......	17	25
Total		19	......	......	56	75	9	......	......	49	58
St. Tammany	22	20	......	......	82	102	27	1	......	119	147
Washington	22	0	......	......	7	7	1	......	......	4	5
Total		20	......	......	89	109	28	1	......	123	152
Ascension	23	......	......	......	2	2	4	......	......	15	19
Assumption	23	17	......	......	28	45	9	......	......	15	24
St. James	23	12	......	......	12	24	1	......	......	16	17
Total		29	......	......	42	71	14	......	......	46	60
Jefferson	24	4	......	......	72	76	5	......	......	140	145
St. Charles	24	9	......	......	14	23	13	......	......	65	78
St. John	24	13	......	......	15	28	6	......	......	26	32
Total		26	......	......	101	127	24	......	......	231	255
Plaquemines	25	......	......	......	89	89	10	......	......	99	109
St. Bernard	25	3	......	......	26	29	4	......	......	76	80
Total		3	......	......	115	118	14	......	......	175	189
Bossier	26	6	......	......	13	19	26	......	......	8	34
Webster	26	13	......	......	31	44	10	......	......	5	15
Total		19	......	......	44	63	36	......	......	13	49
St. Landry	27	2	......	......	9	11	10	......	......	32	42
Total		2	......	......	9	11	10	......	......	32	42
Orleans	......	18	......	......	32	50	......	......	......	97	97
Total		18	......	......	32	50	......	......	......	97	97
GRAND TOTAL	......	589	2	......	1237	1828	827	48	16	1713	2604

PRODUCTION AND VALUATION OF FRESH AND SALT WATER FISHES

FRESH WATER FISHERIES:

	1944		
	Production		Value
Catfish	3,973,753	Lbs.	$ 1,092,782 08
Gaspergou	1,324,681	Lbs.	231,819.18
Spoonbill	88,889	Lbs.	17,777.80
Buffalo	3,564,503	Lbs.	891,125.75
Fresh Water Turtles	59,620	Lbs.	11,924.00
Frogs	788,998	Lbs.	361,245.00
Fresh Water Shrimp	224,818	Lbs.	78,686.30
Crayfish	934,686	Lbs.	327,140.10
Miscellaneous	490,332	Lbs.	98,066.40
	11,450,280	Lbs.	
"Baby" Green Turtles	1,501,789	Turtles	30,035.80
Terrapins	21,021	Doz.	420,420.00
			$ 3,561,022.41

Miscellaneous: Includes Gars, German Carps, Drums, etc.

SALT WATER FISHERIES:

	1944		
	Production		Value
Speckled Sea Trout	304,629	Lbs.	$ 137,083.05
Red Fish	200,290	Lbs.	100,145.00
Sheepshead	53,281	Lbs.	18,648.35
Flounders	92,613	Lbs.	41,675.85
Snappers	273,284	Lbs.	95,649.40
Salt Water Catfish	76,250	Lbs.	19,062.50
Common Salt Water Fish	601,331	Lbs.	150,332.75
Salt Water Turtles	48,418	Lbs.	12,104.50
Crabmeat	2,029,892	Lbs.	1,014,946.00
	2,679,988	Lbs.	
Hard Shell Crabs	1,541,760	Doz.	770,880.00
Soft Shell Crabs	48,255	Doz.	120,637.50
			$ 2,481,164.90

FRESH WATER FISHERIES:

	1945		
	Production		Value
Catfish	4,183,789	Lbs.	$ 1,150,541.98
Gaspergou	1,545,454	Lbs.	270,454.45
Spoonbill	57,843	Lbs.	11,568.60

Buffalo	2,973,081	Lbs.	520,289.17
Fresh Water Turtles	103,549	Lbs.	15,532.35
Frogs	269,507	Lbs.	101,065.50
Fresh Water Shrimp	187,346	Lbs.	65,571.10
Crayfish	982,632	Lbs.	167,047.44
Common Salt Water Fish	486,003	Lbs.	97,200.60
"Baby" Turtles	5,465,246	Turtles	54,652.46
	16,254,450		$ 2,453,923.65
Terrapins	1,979	Doz.	47,496.00

SALT WATER FISHERIES:

	1945 Production		Value
Salt Water Catfish	150,764	Lbs.	$ 22,614.60
Speckled Sea Trout	340,208	Lbs.	102,062.40
Red Fish	201,128	Lbs.	70,394.80
Sheepshead	76,001	Lbs.	26,600.35
Flounders	88,488	Lbs.	30,970.80
Common Salt Water Fish	1,457,372	Lbs.	218,605.80
Red Snappers	353,475	Lbs.	123,716.25
Salt Water Turtles	41,149	Lbs.	10,287.25
Crabmeat	1,387,914	Lbs.	693,957.00
Hard Shell Crabs	1,807,373	Doz.	903,686.50
Soft Shell Crabs	63,987	Doz.	223,954.50
	5,967,859		$ 2,426,850.25

The above values are at the fishing grounds, i.e., prices paid to the commercial fishermen, which value becomes augmented as the product is passed on to dealers, retailers and finally to the consumers.

PRODUCTION OF LOUISIANA SALT WATER SHRIMP

@ 210 Pounds Per Barrel

	BARRELS	
	1944	1945
Sold through New Orleans French Market	38,104	45,053
Sold in green state in Miss. for processing and headless	47,061	59,065
Sold in green state for canning and packing in Louisiana	100,352	107,363
Sold in green state as headless	189,860	170,302
Sold in green state for drying	90,588	90,271
Sold in green state as whole shrimp for canning and processing	113,545	58,165
TOTAL	579,510	530,219

Fish rescue crew at work. Seining and transferring fish.

DIVISION OF FISH AND GAME

MAJOR JAMES BROWN, *Director*

BROWN

This report covers the work of the Fish and Game Division during 1944 and 1945. Although curtailed by lack of materials and man power, the basic responsibilities of this Division have each received as much attention as could be given them. The groundwork for the future work of this Division has been carefully planned and prepared. Basic research work has been accomplished and preliminary investigations made. With the return of the armed forces to their homes we can expect an increase of approximately thirty per cent in our hunters and fishermen. 94,609 hunting licenses, 36,112 fishing licenses and 9,842 trapping licenses were sold in 1943. 124,485 hunting licenses, 33,239 fishing licenses and 9,415 trapping licenses were sold in 1944. Preliminary reports indicate an increase for 1945 in the sale of hunting licenses. With the expected increase for 1946 we will have a hunting load of 175,000 to 200,000 hunters. This means that if Louisiana is to hold and increase its wildlife resources, a greatly enlarged game and fish program must be initiated and carried through until all of our available lands and waters are producing and carrying their maximum wildlife populations.

The tables appearing on the next eleven pages give the fish distribution from the Lacombe, Monroe and Beechwood State Fish Hatcheries, the Seining crew and from the Federal Fishery Station at Natchitoches during 1944 and 1945:

TABLE I

SUMMARY FISH DISTRIBUTION—1944

	L. M. Bass		Perch		Spoonbill		Crappie		Striped Bass		Total		Disposition
	No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.	
Lacombe Fish Hatchery													
July 10, 1944	867	115									867	115	Franklin
Oct. 25, 1944	383	68									383	68	Bogalusa Creek
Oct. 25, 1944	400	72									400	72	12 Mile Creek
Oct. 26, 1944	239	41									239	41	University Lake
Oct. 26, 1944	226	28									226	28	University Lake
Oct. 27, 1944	504	56									504	56	Bogalusa Creek
Oct. 27, 1944	402	72									402	72	Franklinton, La.
Oct. 28, 1944	415	71									415	71	Abita Springs
Oct. 28, 1944	30	17									30	17	Tchefuncta River
Oct. 28, 1944	975	37									975	37	Tchefuncta River
Oct. 29, 1944	2,400	60									2,400	60	Baton Rouge, La.
Oct. 30, 1944	2,952	63¾									2,952	63¾	Baton Rouge, La.
Oct. 30, 1944	2,206	56½									2,206	56½	Bogue Chitta
Oct. 31, 1944	1,325	53									1,325	53	Bogue Chitta
Oct. 31, 1944	21	11									21	11	Bogue Chitta
Oct. 31, 1944	2,808	61									2,808	61	Warner's Creek
Oct. 31, 1944	2,808	61									2,808	61	Covington
Nov. 1, 1944	800	31									800	31	Greensburg, La.
Nov. 3, 1944	89	64									89	64	Spillway
Nov. 4, 1944	43	30									43	30	Spillway
	19,893	1,068¼									19,893	1,068¼	

TABLE I—Continued

SUMMARY FISH DISTRIBUTION—1944

	L. M. Bass		Perch		Spoonbill		Crappie		Striped Bass		Total		Disposition
	No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.	
Monroe Fish Hatchery													
Nov. 18, 1944	14,544	571	43,400	1,085	....	....	....	....	....	....	57,944	1,656	Bayou DeSaird
Beechwood Fish Hatchery													
Nov. 22, 1944	2,711	105	3,440	104	....	....	....	....	....	....	6,151	209	Chicot Park
Nov. 24, 1944	446	17½	1,800	21	....	....	....	....	....	....	2,246	38½	Haynesville
Dec. 5, 1944	2,518	87	3,390	40	....	....	....	....	....	....	5,908	127	Cloutierville
Dec. 11, 1944	1,041	77	5,200	98	....	....	....	....	....	....	6,241	175	Forest Hill, La.
Dec. 11, 1944	631	53	3,815	65	....	....	....	....	....	....	4,446	118	Calcasieu River
Dec. 12, 1944	1	2	3,194	62	....	....	....	....	....	....	3,195	64	Chicot Park
	7,348	341½	20,839	390	....	....	....	....	....	....	28,187	731½	
Natchitoches Fed. Fish Hatchery													
June 2, 1944	5,810	69	....	....	....	....	....	....	....	....	5,810	69	Monroe Hatchery
June 3, 1944	4,933	45½	....	....	....	....	....	....	....	....	4,933	45½	Monroe Hatchery
June 6, 1944	9,875	98¾	....	....	....	....	....	....	....	....	9,875	98¾	Monroe Hatchery
June 7, 1944	8,545	87	....	....	....	....	....	....	....	....	8,545	87	Monroe Hatchery
June 8, 1944	7,820	97¾	....	....	....	....	....	....	....	....	7,820	97¾	Beechwood Hatch.

TABLE I—Continued

SUMMARY FISH DISTRIBUTION—1944

Natchitoches Fed. Fish Hatchery, Continued	L. M. Bass		Perch		Spoonbill		Crappie		Striped Bass		Total		Disposition
	No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.	
June 9, 1944	7,760	97	....	....	....	....	....	....	....	....	7,760	97	Beechwood Hatch.
June 10, 1944	3,593	68½	....	....	....	....	....	....	....	....	3,593	68½	Beechwood Hatch.
June 13, 1944	7,169	112	....	....	....	....	....	....	....	....	7,169	112	Beechwood Hatch.
June 13, 1944	1,840	28¾	....	....	....	....	....	....	....	....	1,840	28¾	Beechwood Hatch.
June 14, 1944	850	47	....	....	....	....	....	....	....	....	850	47	Beechwood Hatch.
June 17, 1944	846	45¼	....	....	....	....	....	....	....	....	846	45¼	Beechwood Hatch.
June 22, 1944	709	26½	....	....	....	....	....	....	....	....	709	26½	Beechwood Hatch.
June 24, 1944	3,135	109¾	....	....	....	....	....	....	....	....	3,135	109¾	Beechwood Hatch.
June 28, 1944	7,697	213½	....	....	....	....	....	....	....	....	7,697	213½	Beechwood Hatch.
Sept. 16, 1944	7,370	126	....	....	....	....	....	....	....	....	7,370	126	Bay at Hecker
Sept. 16, 1944	6,613	126	....	....	....	....	....	....	....	....	6,613	126	Gum-cove Area
Sept. 18, 1944	5,132	126	....	....	....	....	....	....	....	....	5,132	126	Lake Bistineau
Sept. 18, 1944	3,573	87½	....	....	....	....	....	....	....	....	3,573	87½	Lake Chicot
	93,270	1,611¾	....	....	....	....	....	....	....	....	93,270	1,611¾	
Barrow Pits													
July 17, 1944	9	8½	....	....	6	10	367	83½	2	1	384	103	Lake Providence
July 18, 1944	10	13	....	....	7	9½	555	182	....	....	572	204½	Lake Providence
July 19, 1944	15	11	....	....	1	½	459	101½	....	....	475	113	Lake Providence
July 20, 1944	56	16½	....	....	....	....	1,040	103½	....	....	1,096	120	Edward's Lake
July 21, 1944	22	9	300	6	....	....	1,144	110	....	....	1,466	125	Clear Lake
July 24, 1944	18	18	400	10	....	....	1,070	116	....	....	1,488	144	Lake Providence

TABLE I—Continued

SUMMARY FISH DISTRIBUTION—1944

	L. M. Bass		Perch		Spoonbill		Crappie		Striped Bass		Total		Disposition
	No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.	
July 25, 1944	24	21½	200	5	....	....	1,317	101½	....	....	1,541	128	Edward's Lake
July 26, 1944	42	33	....	....	14	28	1,469	120	....	....	1,525	181	Lake Providence
July 26, 1944	72	68	....	....	40	14	379	61	....	....	491	143	Omega Lake
July 27, 1944	17	8	....	....	2	3	842	129	....	....	861	140	Lake Providence
July 28, 1944	40	35	....	....	3	3	243	96	....	....	286	134	Lake Providence
July 29, 1944	79	11	....	....	1	½	543	118	....	....	623	129½	Prison Lake Farm
Aug. 1, 1944	53	16	....	....	3	½	625	84	....	....	681	100½	Lake Providence
Aug. 7, 1944	63	29	....	....	7	8	385	104	....	....	455	141	Lake Providence
Aug. 8, 1944	32	19	....	....	14	11	393	118	....	....	439	148	Bonita Lake
Aug. 9, 1944	13	9	....	....	3	1	412	144	....	....	428	154	Lake Providence
Aug. 10, 1944	42	36	....	....	....	....	1,027	143	....	....	1,069	179	Bonita Lake
Aug. 11, 1944	104	85	....	....	32	47	2,309	298	....	....	2,445	430	Bonita Lake
Aug. 14, 1944	395	88	....	....	11	11	3,971	500	....	....	4,377	599	Lake Providence
Aug. 15, 1944	6	5	....	....	16	27	580	149	....	....	602	181	Lake Providence
Aug. 16, 1944	....	....	....	....	....	....	417	56	....	....	417	56	Lake Lafourche
Aug. 16, 1944	90	15	....	....	....	....	1,440	112	....	....	1,530	127	Clear Lake
Aug. 17, 1944	3	1	....	....	....	....	240	56	11	7	254	64	Lake Erwin
Aug. 17, 1944	....	....	....	....	....	....	302	126	....	....	302	126	Clear Lake
Aug. 17, 1944	15	36	....	....	30	67	....	....	....	....	45	103	Lake Providence
Aug. 18, 1944	27	32½	....	....	1	1	472	217	....	....	500	250½	Lake Lafourche
Aug. 19, 1944	15	27	....	....	....	....	470	132	....	....	485	159	Lake Providence
Aug. 21, 1944	6	2	....	....	....	....	131	21	....	....	137	23	Lake Providence
Aug. 22, 1944	5	3	....	....	35	78	263	95	....	....	303	176	Lake Providence
Aug. 23, 1944	1	3	....	....	8	16	169	69	....	....	178	88	Lake Providence

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TABLE I—Continued

SUMMARY FISH DISTRIBUTION—1944

Barrow Pits—Continued	L. M. Bass		Perch		Spoonbill		Crappie		Striped Bass		Total		Disposition
	No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.	
Aug. 24, 1944	8	5½	......	......	1	1	332	70	......	......	341	76½	Lake Providence
Aug. 25, 1944	38	15	......	......	40	42	231	75	......	......	309	132	Lake Providence
Sept. 23, 1944	2	6	......	......	......	......	240	110	......	......	242	116	Lake Bruin
Sept. 25, 1944	4	6	......	......	......	......	272	35	9	6	285	47	Bear Lake
Sept. 26, 1944	31	19	......	......	......	......	623	126	11	7	665	152	Bear Lake
Sept. 27, 1944	13	16	......	......	......	......	912	261	35	27	960	304	Bear Lake
Sept. 28, 1944	52	59	......	......	......	......	910	182	9	3½	971	244½	Bear Lake
Sept. 29, 1944	25	8	......	......	......	......	630	126	......	......	655	134	Bear Lake
Oct. 2, 1944	41	48	......	......	5	15	1,242	389	......	......	1,288	452	Bear Lake
Oct. 2, 1944	50	50	......	......	......	......	810	200	......	......	860	250	Willow Lake
Oct. 2, 1944	50	62	......	......	43	129	800	232	......	......	893	423	Lake Bruin
Oct. 4, 1944	24	24	......	......	24	72	630	191	......	......	678	287	Lake Bruin
Oct. 5, 1944	2	3	......	......	......	......	705	230	......	......	707	233	Lake Bruin
Oct. 6, 1944	60	33½	......	......	......	......	814	260	......	......	874	293½	Lake Bruin
Oct. 9, 1944	63	41	......	......	......	......	974	187	......	......	1,037	228	Lake Bruin
Oct. 10, 1944	6	3	......	......	......	......	264	91	......	......	270	94	Lake Bruin
Oct. 11, 1944	143	33	......	......	......	......	9,470	221	......	......	9,613	254	Lake Bruin
Oct. 12, 1944	14	3	......	......	......	......	217	60	......	......	231	63	Lake Bruin
	1,900	1,094	900	21	347	595	43,110	6,792	77	51½	46,334	8,553½	
Grand Total	136,955	4,686½	65,139	1,496	347	595	43,110	6,792	77	51½	245,628	13,621	

TABLE II

SUMMARY FISH DISTRIBUTION—1945

	L. M. Bass		Perch		Spoonbill		Crappie		Striped Bass		Total		Disposition
	No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.	
Barrow Pits													
Aug. 8, 1945	7	7	11,704	1,478	309	400					12,000	1,885	Angola Lake
Aug. 24, 1945	157	24	11,878	459	43	39					12,078	522	Angola Lake
Sept. 1, 1945	2	3			109	45½	78	17			189	65½	Lake Providence
Sept. 3, 1945	1	1½			125	48	206	89	8	6	340	144½	Lake Providence
Sept. 4, 1945					50	20½	130	39	1	1½	181	61	Lake Providence
Sept. 6, 1945							1,855	126			1,855	126	Lake Providence
Sept. 7, 1945	3	4					2,695	182			2,698	186	Lake Providence
Sept. 8, 1945							1,700	119			1,700	119	Haynesville, La.
Sept. 10, 1945	2	½					1,800	160			1,802	160½	Lake Providence
Sept. 11, 1945							1,800	126			1,800	126	Lake Erwin
Sept. 11, 1945	6	6					900	56			906	62	Lake Lafourche
Sept. 12, 1945			9,000	126							9,000	126	Major's Lake
Sept. 13, 1945	176	20					800	100			976	120	Bonita Lake
Sept. 14, 1945	4	1½			18	22	211	156	17	5½	251	186	Lake Providence
Sept. 15, 1945			11,000	126							11,000	126	Jackson, La.
Sept. 17, 1945					11	9½	314	60½			345	77	Lake Providence
Sept. 18, 1945	6	4½			22	20	900	103			928	127½	Edward's Lake
Sept. 20, 1945	5	4			80	40	154	15			239	59	Lide's Lake
Sept. 21, 1945					47	40	215	21			262	61	Lide's Lake
Sept. 22, 1945					120	100	190	48			310	148	Lide's Lake
Sept. 24, 1945							550	80			550	80	Lake Despair
Sept. 24, 1945					63	60	232	30			295	90	Lide's Lake
Sept. 25, 1945							720	126			720	126	Lake Despair
Sept. 25, 1945	8	6			68	56	15	7			92	70	Lide's Lake

TABLE II—Continued

SUMMARY FISH DISTRIBUTION—1945

Barrow Pits—Continued	L. M. Bass		Perch		Spoonbill		Crappie		Striped Bass		Total		Disposition
	No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.	
Sept. 26, 1945	49	49					440	77			489	126	Lake Despair
Sept. 26, 1945	1	4¾			47	40			8	7	56	51¾	Lide's Lake
Sept. 27, 1945							720	126			720	126	Clear Lake
Sept. 27, 1945					107	100					107	100	Lide's Lake
Sept. 28, 1945							439	123			439	123	Horseshoe Lake
Oct. 2, 1945	4	4			24	24	150	20			178	48	Lide's Lake
Oct. 3, 1945							436	126			436	126	Horseshoe Lake
Oct. 4, 1945	6	6					531	119			537	125	Edward's Lake
	437	145¾	43,582	2,189	1,243	1,064½	18,181	2,251½	34	20	63,499	5,679¾	
Monroe Fish Hatchery													
Oct. 29, 1945	15,447	589	21,195	471							36,642	1,060	Bayou DeSaird
Beechwood Fish Hatchery													
Oct. 23, 1945	645	77	2,300	35							2,945	112	Chicot Park
Oct. 26, 1945	736	124									736	124	Sulhur, La.
Oct. 26, 1945	2,200	77									2,200	77	Occupy Church
Oct. 27, 1945	689	49									689	49	Bayou Clear
Oct. 31, 1945	1,125	45									1,125	45	DeQuincy, La.

TABLE II—Continued

SUMMARY FISH DISTRIBUTION—1945

	L. M. Bass		Perch		Spoonbill		Crappie		Striped Bass		Total		Disposition
	No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.	
Nov. 1, 1945	333	43	....	....	....	....	....	....	....	....	333	43	Elizabeth, La.
Nov. 2, 1945	7,700	154	....	....	....	....	....	....	....	....	7,700	154	Calcasieu River
Nov. 3, 1945	4,200	84	....	....	....	....	....	....	....	....	4,200	84	Sieper, La.
Nov. 3, 1945	1,171	79½	....	....	....	....	....	....	....	....	1,171	79½	Elizabeth, La.
	18,799	732½	2,300	35	....	....	....	....	....	....	21,099	767½	
Lacombe Fish Hatchery													
Nov. 13, 1945	620	35	....	....	....	....	....	....	....	....	620	35	Covington, La.
Nov. 13, 1945	776	47	....	....	....	....	....	....	....	....	776	47	Bayou Liberty
Nov. 19, 1945	2,218	97	460	40	....	....	....	....	....	....	2,678	137	Bogue Chitta
Nov. 20, 1945	1,000	35	....	....	....	....	....	....	....	....	1,000	35	Baton Rouge
Nov. 20, 1945	2,200	77	....	....	....	....	....	....	....	....	2,200	77	University Lake
Nov. 21, 1945	2,041	157	....	....	....	....	....	....	....	....	2,041	157	Prairieville, La.
Nov. 22, 1945	672	42	1,260	84	....	....	....	....	....	....	1,932	126	Bayou Liberty
Nov. 22, 1945	1,942	146	....	....	....	....	....	....	....	....	1,942	146	Bogalusa Creek
Nov. 23, 1945	2,028	156	....	....	....	....	....	....	....	....	2,028	156	Abita Springs
Nov. 27, 1945	2,016	144	....	....	....	....	....	....	....	....	2,016	144	Tchefuncta River
Nov. 28, 1945	2,072	144	....	....	....	....	....	....	....	....	2,072	144	Covington
Nov. 28, 1945	2,004	144	....	....	....	....	....	....	....	....	2,004	144	Bayou Lacombe
	19,589	1,224	1,720	124	....	....	....	....	....	....	21,309	1,348	

TABLE II—Continued

SUMMARY FISH DISTRIBUTION—1945

	L. M. Bass		Perch		Spoonbill		Crappie		Striped Bass		Total		Disposition
	No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.	
Natchitoches Fed. Fish Hatchery													
Jan. 3, 1945	1,487	119									1,487	119	Taylortown
Jan. 5, 1945	1,131	91	2,000	32							3,131	123	Horton Lake
Jan. 7, 1945	3,009	119									3,009	119	Haynes Lake
May 28, 1945	22,400	126									22,400	126	Haynesville, La.
May 30, 1945	11,600	90									11,600	90	Oak Ridge, La.
June 4, 1945	8,708	90									8,708	90	DeQuincy, La.
June 6, 1945	7,477	90									7,477	90	Leesville, La.
June 7, 1945	6,875	90									6,875	90	Lake Charles, La.
June 8, 1945	5,334	42									5,334	42	Colfax, La.
June 12, 1945	7,431	88									7,431	88	Sulphur, La.
June 14, 1945	7,667	95									7,667	95	Chicot Lake
June 15, 1945	14,115	90									14,115	90	Gold Point Lake
June 15, 1945	900	4									900	4	Jackson Hos. Lake
June 19, 1945	7,200	90									7,200	90	Chicot Lake
June 20, 1945	4,200	15									4,200	15	Chaplain's Lake
June 20, 1945	7,200	90									7,200	90	University Lake
June 21, 1945	8,000	90									8,000	90	Calcasieu River
June 22, 1945	8,000	90									8,000	90	Calcasieu River
June 23, 1945	8,000	90									8,000	90	Spring Creek
June 26, 1945	8,784	90									8,784	90	Franklin, La.
June 28, 1945	7,967	90									7,967	90	Calcasieu River
June 28, 1945	10,000	90									10,000	90	Bayou Boeuf

TABLE II—Continued

SUMMARY FISH DISTRIBUTION—1945

	L. M. Bass		Perch		Spoonbill		Crappie		Striped Bass		Total		Disposition
	No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.	
July 4, 1945........	10,286	90	....	....	....	....	....	....	....	....	10,286	90	Homer, La.
July 5, 1945........	3,329	30	....	....	....	....	....	....	....	....	3,329	30	Ben Estes Lake
July 5, 1945........	3,329	30	....	....	....	....	....	....	....	....	3,329	30	Old River Lake
July 5, 1945........	1,665	10	....	....	....	....	....	....	....	....	1,665	10	Lake Lewie
July 5, 1945........	2,315	20	....	....	....	....	....	....	....	....	2,315	20	Baxter Bayou
July 6, 1945........	3,904	35	....	....	....	....	....	....	....	....	3,904	35	Clear Lake
July 6, 1945........	2,860	25	....	....	....	....	....	....	....	....	2,860	25	Wiggens Lake
July 6, 1945........	1,716	15	....	....	....	....	....	....	....	....	1,716	15	Heard's Pond
July 6, 1945........	1,144	10	....	....	....	....	....	....	....	....	1,144	10	Calhoun's Pond
July 6, 1945........	572	5	....	....	....	....	....	....	....	....	572	5	Jenkin's Pond
July 7, 1945........	8,560	90	....	....	....	....	....	....	....	....	8,560	90	Shreveport, La.
July 10, 1945........	11,420	126	....	....	....	....	....	....	....	....	11,420	126	Lake Bistineau
July 11, 1945........	11,833	126	....	....	....	....	....	....	....	....	11,833	126	Lake Bistineau
Dec. 3, 1945........	1,134	126	....	....	....	....	....	....	....	....	1,134	126	Johnson's Lake
Dec. 5, 1945........	1,089	121	....	....	....	....	....	....	....	....	1,089	121	Calcasieu River
Dec. 8, 1945........	1,134	126	....	....	....	....	....	....	....	....	1,134	126	Horseshoe Lake
Dec. 10, 1945........	478	128	....	....	....	....	....	....	....	....	478	128	12 Mile Bayou
Dec. 11, 1945........	396	126	....	....	....	....	....	....	....	....	396	126	Lake Colfax
Dec. 12, 1945........	958	126	....	....	....	....	....	....	....	....	958	126	Chicot Lake
Dec. 13, 1945........	1,064	128½	....	....	....	....	....	....	....	....	1,064	128½	Black Lake

TABLE II—Continued

SUMMARY FISH DISTRIBUTION—1945

Natchitoches Fed. Fish Hatchery, Continued	L. M. Bass		Perch		Spoonbill		Crappie		Striped Bass		Total		Disposition
	No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.	
Dec. 15, 1945	200	1¼	......	......	......	......	......	......	......	......	200	1¼	Tulane Univ. Research Proj.
Dec. 17, 1945	807	126	......	......	......	......	......	......	......	......	807	126	Brown's Creek
Dec. 19, 1945	686	126	......	......	......	......	......	......	......	......	686	126	Calcasieu River
Dec. 21, 1945	1,512	82	......	......	......	......	......	......	......	......	1,512	82	Chicot Park
	239,876	3,697¾	2,000	32	......	......	......	......	......	......	241,876	3,729¾	
April 3, 1945	25,000	Fry	......	......	......	......	......	......	......	......	25,000	Fry	Monroe Fish H.
April 7, 1945	92,000	Fry	......	......	......	......	......	......	......	......	92,000	Fry	Beechwood Fish H.
April 9, 1945	54,000	Fry	......	......	......	......	......	......	......	......	54,000	Fry	Lacombe Fish H.
April 18, 1945	121,500	Fry	......	......	......	......	......	......	......	......	121,500	Fry	Shreveport F. H.
Total Fry	292,500		......	......	......	......	......	......	......	......	292,500		
Grand Total, 1945	294,148	6,389	70,797	2,851	1,243	1,064½	18,181	2,251½	34	20	384,425	12,585*	
	(292,500 Fry)										(292,500 Fry)		
Total No. Fish	586,648		70,797		1,243		18,181		34		676,925		

* Includes 22 other fish weight 9 lbs.

An Agent of this Division is permanently stationed on Lake Bruin in Tensas Parish. The following table gives the monthly tabulation of licenses checked, and the numbers of bass and crappie the fishermen had on their stringers when they were checked by him:

CATCH AND LICENSES

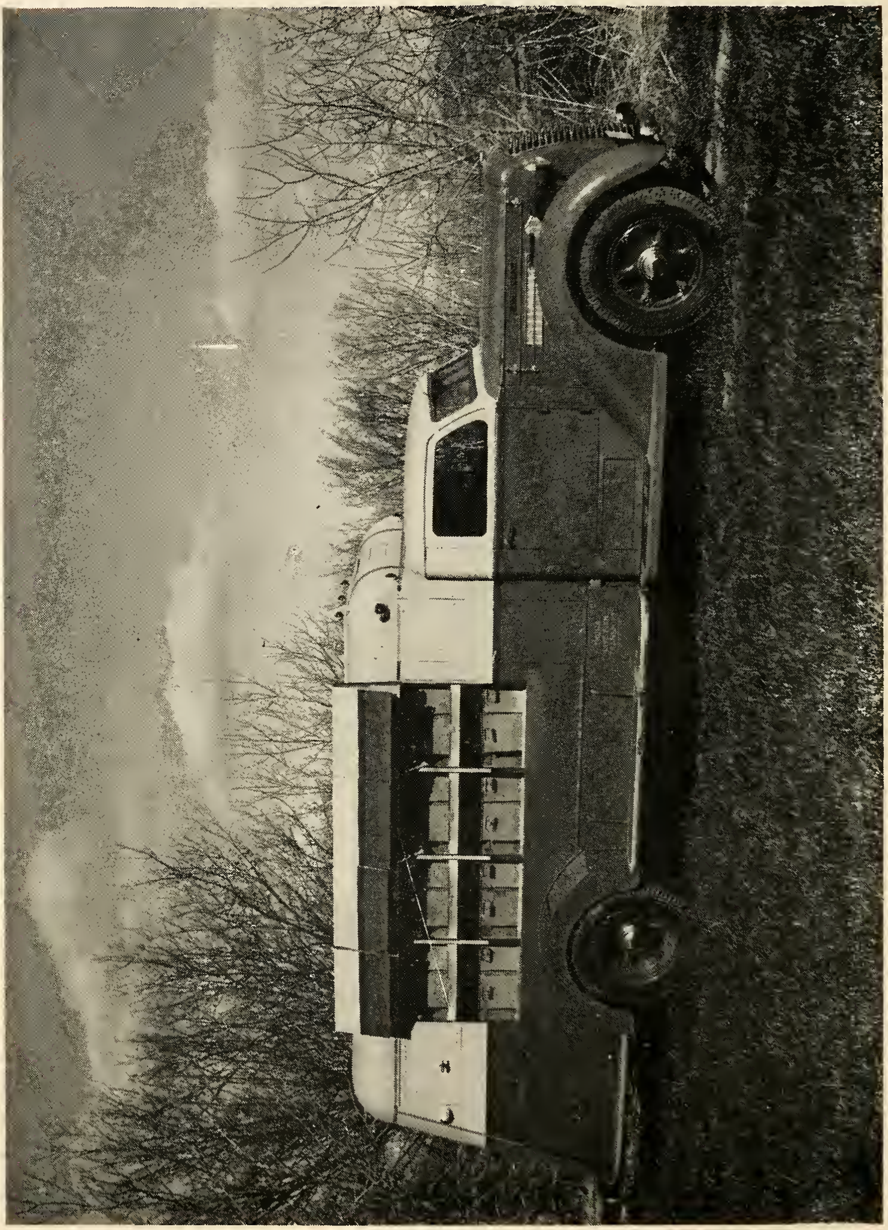
Lake Bruin Fish Preserve

	Licenses		Species	
Month	Non-Resident	Resident	Bass	Crappie
	1944			
January	116	30	729	196
February	174	39	1,050	461
May	500	397	4,092	5,910
June	238	259	2,083	3,094
July	269	258	2,173	2,613
August	160	158	1,380	1,025
September	229	128	1,512	517
October	238	113	1,539	1,382
November	150	43	1,129	513
December	72	17	544	228
TOTAL, 1944	2,146	1,442	16,231	15,939
	1945			
January	94	33	568	305
February	120	27	769	141
May	535	293	2,446	3,520
June	254	242	1,320	3,674
July	260	229	1,441	2,367
August	201	178	1,891	2,241
September	163	106	1,402	1,164
October	176	109	1,661	1,100
November	121	50	1,110	473
December	72	19	584	106
TOTAL, 1945	1,996	1,286	13,192	15,091

L. S. U.
Library
Lo. Coll.

Gar and Predator control work was carried on in Lake Bruin, by Mr. David M. Lide, under a contract with the Tensas Parish Police Jury, approved by the Wild Life and Fisheries Department and supervised by the Fish and Game Division. This most important work had to be terminated during the war. All the equipment used in this work has been purchased by this Division. It is hoped that this work can be resumed in this and other lakes in the near future.

The Northwest Louisiana Fish and Game Preserve comprises Black, Clear and Saline Lakes. Allen Dam, built

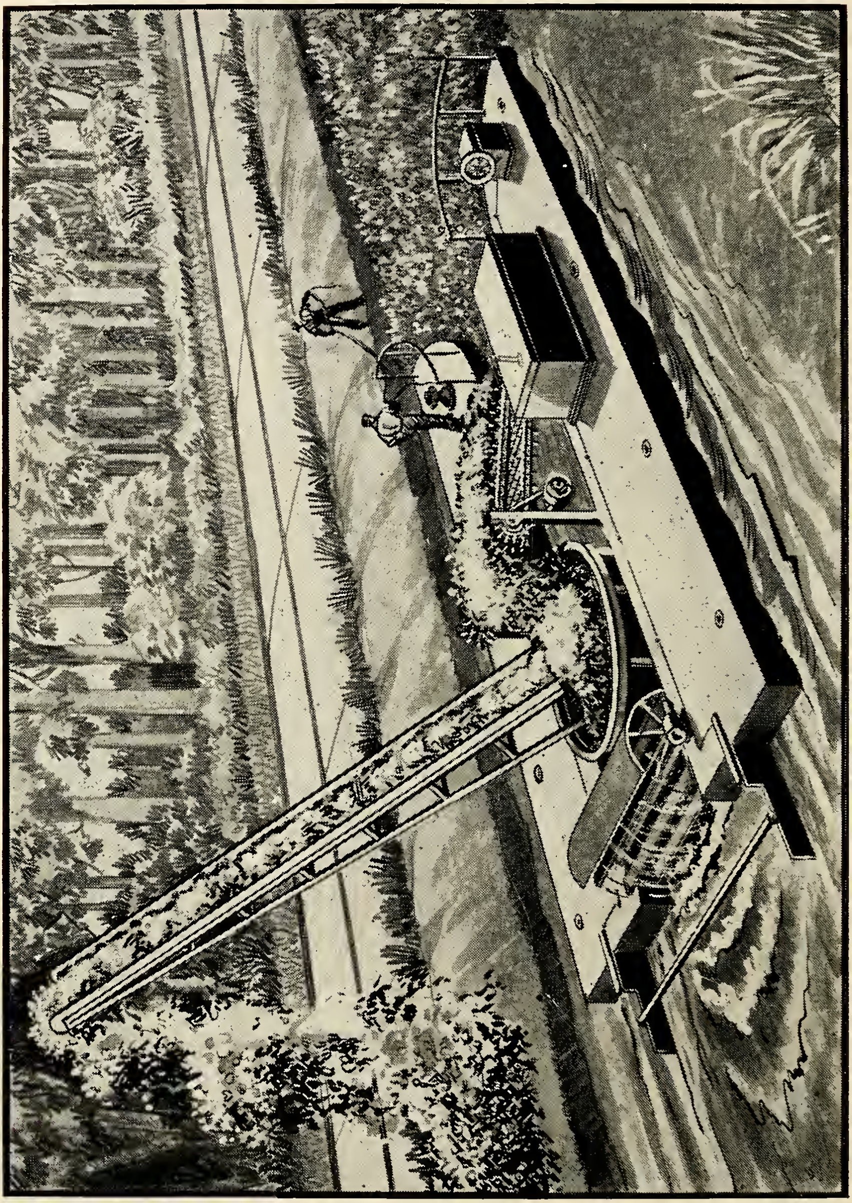


New Fish Transportation truck, which is expected to be in use for the first time during Spring of 1946.

by the Conservation Department across Saline Bayou, controls the water levels in these lakes. The apron below this dam has been undermined and the bank on the State-owned side of the bayou is being washed away to such an extent that the caretaker's house will be endangered in the near future. It is hoped that the Representatives and Senators representing this area will obtain an appropriation from the Legislature sufficient to save the dam and the house. The dirt fill at the Chivary has washed out and should be restored with a permanent fill. The Water Hyacinths in Saline Lake should also be removed. Although these are all major projects, it must be recognized that this Preserve furnishes the finest year 'round fishing in Louisiana and also usually provides some excellent duck hunting. The loss of this Preserve would be a catastrophe, not only to central Louisiana but to the entire program for our wildlife resources.

A new fish transportation unit has been ordered and delivery is expected this spring. This new fish truck, added to the two units now in operation, will greatly increase the number of game fish rescued from the barrow pits and distributed in the heavily fished waters of the State. During the high water periods the fish rescue crew will be used in gar and predator control work.

Louisiana is faced with a terrific problem in the destruction of the Water Hyacinth and Alligator grass. These two water pests have now become a problem in every section of the State. They have not only ruined much of our finest fishing waters, but now they seriously block transportation, drainage and have become a health menace to many of our communities. New machines are being constructed, and research work is being carried on to develop chemicals that can destroy these plants without endangering our people, live stock and all aquatic life. The two small experimental machines have been operated as follows:



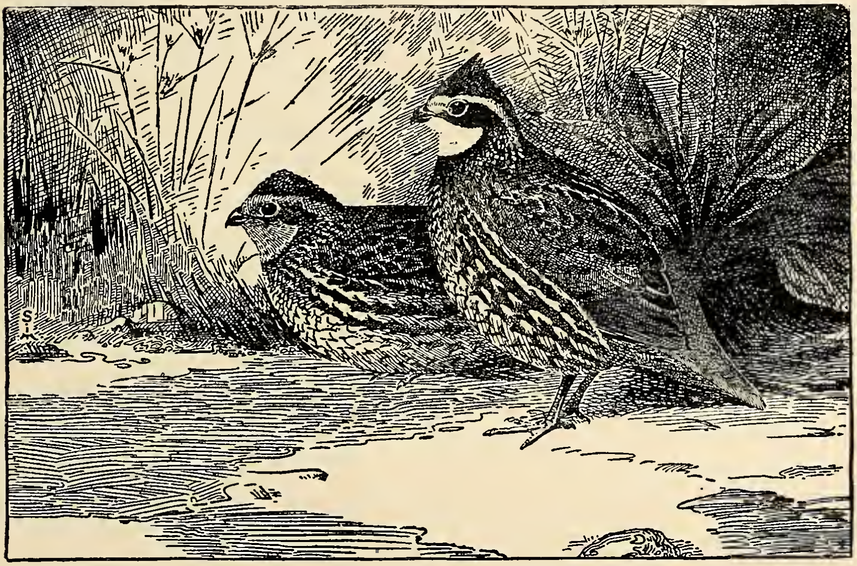
Proposed New Water Hyacinth Machine

MACHINE No. 1

PERIOD	LOCATION	PARISH
Jan. and Feb., 1944	Bayou Conway	Ascension
March—August 1, 1944	No Activities	
Aug. 1—Oct. 1, 1944	Jefferson Parish Health Unit	Jefferson
Oct. 1—Jan. 1, 1945	Taft, La.	St. Charles
Jan. 1—June 1, 1945	Paradis, La.	St. Charles
June 1—Nov. 1, 1945	Franklin, La.	St. Mary
Nov. 1—Jan. 21, 1946	Paradis, La.	St. Charles
Jan. 21—	Baton Rouge, La.	East Baton Rouge

MACHINE No. II
(Loaned to and operated by Terrebonne Parish Police Jury)

PERIOD	LOCATION	PARISH
Oct., 1944—Jan., 1946	Houma, La.	Terrebonne



Their Majesties, Mr. and Mrs. Bob White.

The Quail distributions from our hatcheries have declined due to many causes. The Natchitoches Quail Hatchery had to be abandoned because of disease that could not be checked. The very small area occupied by this hatchery prevented moving the equipment to fresh ground. Mr. Fred Pace, the Superintendent, was transferred to take charge of the L. S. U. Hatchery in Baton Rouge in December, 1944. Lack of personnel, inability to obtain proper game bird feeds and very poor service from the Power Company at Lacombe has reduced our expected yields from both hatcheries. These conditions should now be improved and a much greater production is expected from both hatcheries. The following is the tabulation of the quail distribution for 1944 and 1945:

QUAIL DISTRIBUTION—1944

SPRING DISTRIBUTION

DATE	NUMBER	DISPOSITION
LACOMBE HATCHERY		
4/14/44	60	W. L. Coats, Myrtle Grove, La., Plaquemines Parish
4/18/44	60	Alton Baker, Kinder, La., Allen Parish
4/18/44	60	O. A. LaHaye, Eunice, La , St. Landry Parish
4/18/44	60	Jack Stanfield, Minden, La., Webster Parish
4/18/44	120	J. V. McConnell, Shreveport, La, Caddo Parish
4/18/44	60	P. W. West, DeRidder, La., Beauregard Parish
4/21/44	15	S. S. Holland, Lake Charles, La., Calcasieu Parish
5/4/44	66	J. V. McConnell, Shreveport, La., Caddo Parish
5/5/44	12	W. V. Whittington, Benton, La., Bossier Parish
5/5/44	36	P. E. Furlow, Shreveport, La., Caddo Parish
TOTAL LACOMBE	579	
L. S. U. HATCHERY		
4/12/44	60	W. A. K. Seale, Sulphur, La., Calcasieu Parish
4/12/44	60	C. O. Alexander, Lake Charles, Calcasieu Parish
4/12/44	60	C. B. Godreau, Jennings, La., Jefferson Davis Parish
4/12/44	60	E. D. Peckam, Crowley, La., Acadia Parish
4/13/44	60	G. E. Portell, Plaquemines, La., Iberville Parish
4/13/44	60	Jos. Bourg, New Iberia, La., Iberia Parish
4/13/44	60	Frank A. Godchaux, Jr., Abbeville, La., Vermilion Parish
4/14/44	60	W. I. Hair, Winnsboro, La., Franklin Parish
4/14/44	90	Joe Combs, Monroe, La., Ouachita Parish
4/14/44	30	W. L. Mattison, Bastrop, La., Morehouse Parish
4/14/44	90	Sheriff's Office, Lake Providence, La., East Carroll Parish
TOTAL L. S. U.	690	
NATCHITOCHES HATCHERY		
4/3/44	190	*D. B. Johnson, Longstreet, La., DeSoto Parish

FALL DISTRIBUTION

DATE	NUMBER	DISPOSITION
L. S. U. HATCHERY		
11/3/44	230	Baton Rouge Sportsmen's League, East Baton Rouge Parish
11/28/44	240	*Carroll J. Perkins, Elizabeth, La., Allen Parish
TOTAL L. S. U. HATCHERY	470	
NATCHITOCHES HATCHERY		
9/28/44	240	*C. J. Perkins, Elizabeth, La., Allen Parish
10/21/44	240	*C. J. Perkins, Elizabeth, La., Allen Parish
11/25/44	157	*Ben Mayeaux, Natchitoches, Natchitoches Parish
TOTAL NATCHITOCHES	637	
LACOMBE HATCHERY		
9/21/44	240	*Rowland P. Vernon, Ruston, La., Lincoln Parish
10/16/44	30	Dudley Weaver, Covington, La., St. Tammany Parish
10/18/44	240	*Rowland P. Vernon, Ruston, La., Lincoln Parish
TOTAL LACOMBE	510	

TOTAL SPRING DISTRIBUTION, 1944	1,459
TOTAL FALL DISTRIBUTION, 1944	1,617
TOTAL QUAIL DISTRIBUTION, 1944	3,076

QUAIL DISTRIBUTION—1945

SPRING DISTRIBUTION

DATE	NUMBER	DISPOSITION
LACOMBE HATCHERY		
4/23/45	90	*John S. Campbell, Baton Rouge, La., East Baton Rouge Parish (Dist.—St. Helena Parish)
5/3/45	24	Dudley Weaver, Covington, La , St. Tammany Parish
5/4/45	48	Bert Oldham, Newellton, La., Tensas Parish
5/11/45	72	W. S. Hinson, Independence, La., Tangipahoa Parish
5/11/45	72	Julius A. Babin, LaPlace, La., St. John Parish
5/14/45	36	Capt. R. N. Walker, Baton Rouge, La., East Baton Rouge Parish

SPRING DISTRIBUTION—(Continued)

DATE	NUMBER	DISPOSITION
5/15/45	36	A. L. Erwin, Covington, La., St. Tammany Parish
5/15/45	30	Wembley, Inc.—Mr. Pulitzer—Folsum, La., St. Tammany Parish
5/15/45	90	W. S. Hinson, Ponchatoula, La., Tangipahoa Parish
5/28/45	84	*J. S. Campbell, Baton Rouge, La., East Baton Rouge Parish
TOTAL LACOMBE	582	
L. S. U. HATCHERY		
4/12/45	162	*Rowland P. Vernon, Ruston, La., Lincoln Parish
4/20/45	18	Albert J. Cook, Baton Rouge, La., East Baton Rouge Parish
4/20/45	18	Millard S. Perkins, Baton Rouge, La., East Baton Rouge Parish
4/20/45	18	Lawrence L. Mahoney, Baton Rouge, La., East Baton Rouge Parish
4/26/45	78	*Rowland P. Vernon, Ruston, La., Lincoln Parish
5/1/45	60	J. A. Partridge, Lake Charles, La., Calcasieu Parish
5/1/45	24	Leo Landry, New Iberia, La., Iberia Parish
5/1/45	48	C. N. Taylor, Jennings, La., Jefferson Davis Parish
5/1/45	36	W. A. K. Seale, Sulphur, La., Calcasieu Parish
5/1/45	60	J. M. Legg, Leesville, La., Vernon Parish
5/3/45	12	J. A. Partridge, Lake Charles, La., Calcasieu Parish
5/3/45	42	E. H. Guillory, Ville Platte, La., Evangeline Parish
5/1/45	36	Paul Schreirer, Morgan City, La., St. Mary Parish
5/5/45	30	W. L. Mattison, Bastrop, La , Morehouse Parish
5/5/45	18	R. C. Graves, Mer Rouge, La., Morehouse Parish
5/10/45	60	P. W. West, DeRidder, La., Beauregard Parish
5/17/45	177	Baton Rouge Sportsmen's League, East Baton Rouge Parish
6/8/45	18	E. H. Guillory, Ville Platte, La., Evangeline Parish
6/8/45	115	P. E. Postell
TOTAL L. S. U.	1,030	

FALL DISTRIBUTION

DATE	NUMBER	DISPOSITION
L. S. U. HATCHERY		
10/14/45	20	H. W. Gideon, Baton Rouge, La., East Baton Rouge Parish
9/11/45	240	*Rowland P. Vernon, Ruston, La., Lincoln Parish
10/9/45	240	*Rowland P. Vernon, Ruston, La., Lincoln Parish
10/29/45	60	John Dale, Jr., Vidalia, La., Concordia Parish
10/29/45	45	Dr. R. E. King, Winnsboro, La., Franklin Parish
10/29/45	45	J. C. Evans, Jonesville, La., Catahoula Parish
10/29/45	30	J. C. Evans, Jonesville, La., Catahoula Parish
10/29/45	60	J. A. Combs, Monroe, La., Ouachita Parish
10/29/45	60	W. T. Mattison, Bastrop, La., Morehouse Parish
10/29/45	30	Bob Williams, Winnsboro, La., Franklin Parish
10/29/45	64	Rep. E. W. Sehon, Tullos, La., LaSalle Parish
10/29/45	32	Clyde Blalock, Jonesboro, La., Jackson Parish
10/29/45	32	Wallace Davis, Jonesboro, La., Jackson Parish
10/29/45	32	L. T. Frey, Jr., Saline, La., Bienville Parish
10/29/45	64	Sen. John W. McCormick, Chenier-Eros Road
10/30/45	30	F. J. Broussard, Breaux Bridge, La., St. Martin Parish
10/30/45	15	Maurice Latiolais, Breaux Bridge, La., St. Martin Parish
10/30/45	15	Cable Thibodeaux, Breaux Bridge, La., St. Martin Parish
10/30/45	15	L. Broussard, Breaux Bridge, La., St. Martin Parish
10/30/45	15	George Congue, Lafayette, La., Lafayette Parish
10/30/45	30	A. J. Hardy, Breaux Bridge, La., St. Martin Parish
11/1/45	20	E. W. Day, Baton Rouge, La., East Baton Rouge Parish
11/1/45	20	R. Brown, Baker, Louisiana, East Baton Rouge Parish
11/4/45	240	*Rowland P. Vernon, Ruston, La., Lincoln Parish
TOTAL L. S. U.	1,454	

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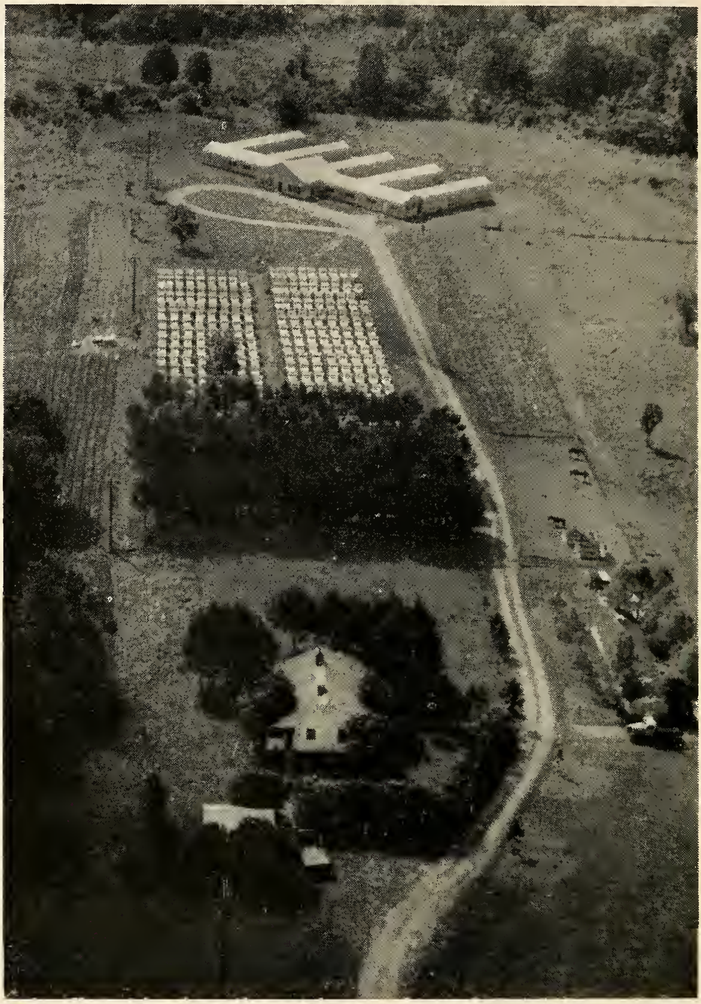
* These quail were all used for experimental plantings by Pittman-Robertson biologists.

TOTAL SPRING DISTRIBUTION, 1945	1,612
TOTAL FALL DISTRIBUTION, 1945	1,454
TOTAL QUAIL DISTRIBUTION, 1945	3,066



Air View of L. S. U. Quail Hatchery.

Federal Aid for Wildlife Restoration Projects, under the Pittman-Robertson Act, has been used during the past biennium for two research projects and one development project. The Pittman-Robertson Act, earmarks a ten per cent excise tax on sporting arms and ammunition for the purpose of extending cooperative aid to the States in wildlife restoration projects. Congress appropriated $15,163.43 to Louisiana for the fiscal year July 1, 1943 to June 30, 1944 and $13,011.88 for the fiscal year July 1, 1944 to June 30,

1945. There was available, with the twenty-five per cent of State funds, $20,217.89 for the fiscal year ending June 30, 1944. There also was available a balance of $6,626.01 carried over from the previous year. In this fiscal year we expended $19,538.39. In the fiscal year ending June 30, 1945, there was available $17,349.11 plus unexpended balance of $8,664.17. We expended $22,604.11 during this period. With the three projects encumbered for the fiscal year ending June 30, 1946, we have available $23,052.64 for new projects. It is expected that Congress will appropriate at least $3,000,000.00 from the $11,000,000.00 that has accumulated in the Pittman-Robertson funds. Louisiana's share should be approximately $40,000.00 with a balance of better than $20,000.00 We will need State funds of at least $20,000.00 each fiscal year to match the Federal funds available.

PITTMAN-ROBERTSON
REPORT OF EXPENDITURES 1943-1944
TWELVE MONTHS ENDING JUNE 30, 1944

Account No.		Total Expenditures Thru June 30
101.00	Salaries	$12,634.56
103.00	Labor	94.20
		12,728.76
210.00	Insurance	146.76
214 00	Freight, Postage	28.20
220.00	Repairs	85.92
226.00	Telephone	138.29
228.04	Lodging	254.31
228.05	Meals	617.78
228.06	Mileage	4,499.15
228.07	Other	199 25
200.00	Miscellaneous	233.24
		6,202.90
336.05	Gas	99.67
336.09	Oil	8.94
300.00	Miscellaneous	255.20
		363.81
Seed and Fertilizer		242 92
TOTAL		$19,538.39

PITTMAN-ROBERTSON
REPORT OF EXPENDITURES 1944-1945
TWELVE MONTHS ENDING JUNE 30, 1945

Account No.		Total Expenditures Thru June 30
101.00	Salaries	$11,357.19
103.00	Labor	15.00
		11,372.19
200.00	Miscellaneous	504.76
210.00	Insurance	185.11
214 00	Postage and Transportation	5.30
220.00	Repairs and Servicing	130.15
226.00	Telephone and Telegraph	165.13
228.00	Travel Expense	4,718.84
		5,709.29
300.00	Miscellaneous	1,297.04
302.00	Building Supplies	426.62
310.00	Electrical Supplies	
314.00	Feed	184.49
322.00	General Plant	216.94
324.00	Hand Tools	
336.00	Motor Vehicle Supplies	87.15
342.00	Repair Supplies	36.83
		2,249.07
600.00	Equipment	3,273.56
TOTAL		$22,604.11

STATE: Louisiana
PROJECT NUMBER: 6-D
DATE: July 1, 1945

ANNUAL PROGRESS REPORT
WILDLIFE DEVELOPMENT
As Required By
FEDERAL AID IN WILDLIFE RESTORATION ACT

1. *Title of Project:* Farm Habitat Improvement
2. *Supervisors:* Major John G. Appel, Commissioner of Wildlife and Fisheries Department; Major James Brown, Director of Fish and Game Division.
3. *Leader:* John S. Campbell, Field Biologist.
4. *Cooperating Agencies:* Louisiana Department of Wildlife and Fisheries, U. S. Soil Conservation Service, Louisiana State University and Agriculture Extension Service.

5. *Perspective:* As originally stated in the preliminary project statement, plans, specifications and estimates.
6. *Objective:* To restore adequate food and cover for bob-white quail on farms of Louisiana.
7. *Plans:* As previously stated in the preliminary project statement.
8. *Probable date of completion:* June 30, 1948.
9. *Relationship of Cooperating Agencies:*

   The School of Agriculture and Forestry at the Louisiana State University is furnishing information gained from previous game management experiments and practices carried on on farms and timbered lands of the State.

   The Agriculture Extension Service is cooperating through the County Agents by assisting field biologists in coordinating their efforts in the field.

   The Soil Conservation Service is furnishing material (Lespedeza seed-bicolor and syrotobotrya) and technical assistance in obtaining results from farms particpating in the project.

I. *Introduction*

This report is prepared by the biologist in charge of the project for the purpose of giving an over-all picture of the progress for the fiscal year. Previously, this project was conducted by the leader and two assistants, but due to the shortage of technical personnel due to the war, and the addition of new projects, it became necessary for the leader to assume full responsibility of the project for the duration. Assistance was obtained by the services of the above mentioned agencies, cooperating sportsmen and farmers participating in the program. This assistance was in the form of personal aid in the field and valuable information gained through observations afield.

At the out-set of the program for the year (fiscal) it was necessary to obtain information as to the number of Soil Conservation Service work unit desiring aid in field border development and to the extent of farm participation in each work unit. This information was needed so as to estimate the amount of material (seed and fertilizer) to be furnished in ample time for early spring planting. Immediately after this information was obtained, plans were made to procure seed from out-of-state growers to be placed in the hand of work unit leaders for early planting in February and March. Expectation of the greater portion of the 1944-45 seed (lespedeza bicolor) to be supplied by a four-acre seed block at the Soil Conservation Service Nursery, Minden, was a disappointment. Instead, of this seed block, producing 2,000 pounds of seed, as expected by previous estimates, it produced only ninety-eight pounds of clean seed.

After the harvest season (1944) it became apparent that out-of-state growers had a greater demand for bicolor seed than they could supply and would not be able to supply the needs for the 1944-45 project. Realizing the critical shortage of bicolor seed on the market, the Soil Conservation Service made available to the state 506 pounds of clean lespedeza bicolor seed and 631 pounds of clean lespedeza syrotobotrya seed. This seed was supplied and delivered to the work units free of cost, reaching the planters in late February and early March. This 1,137 pounds of bicolor and syrotobotrya seed was supplemented by 1,461 pounds of lespedeza sericea seed furnished by the state from a local seed house. Fertilizer 4-12-4 was supplied in the amount of 40,000 pounds for the 202 acres of field borders planted.

II. *Progress Report:*

Material made available for the Soil Conservation Service work units for 1944-45 program. (Clean Lespedeza sericea, bicolor and syrotobotrya seed and 30,000 pounds of 4-12-4 mixed fertilizer.)

Distribution of Material to Soil Conservation Work Units:

Work Unit S. C S.	Sericea Seed	Bicolor Seed	Syrotobotrya Seed	Fertilizer 4-12-4
DeRidder	80	0	32	2,000
Bastrop	192	63	79	4,800
Ruston (Spenc.)	38	12.5	16	800
Winnfield	176	0	141	4,400
Ruston (McCal.)	160	50	63	4,000
Calhoun	192	63	79	4,800
Farmerville	176	63	63	4,400
Ringgold	192	0	158	4,800
Jena	85	85	0	3,400
Many	85	85	0	3,400
Plain Dealing	85	85	0	3,400
Total	1,461#	506.5#	631#	40,200#

ACRES PLANTED

Lespedeza sericea	91.3
Lespedeza bicolor	50.6
Lespedeza syrotobotrya	60.1
Total	202.0 acres

Fertilizer applied at the rate of 200# per acre.

The above material was planted as follows:

Recommendations to Cooperators. Planting combination field borders of Lespedeza sericea-L. bicolor-L. Syrotobotrya should be made of strips with a minimum width of twelve feet and on borders between cultivated fields and woods, ditch banks and fence rows. It is recommended that portions of and the portion adjacent to crop land be seeded to L. Sericea and the portion of and adjacent to woodland be seeded to L. bicolor (or L. syrotobotrya). The width of border for L. Sericea seeding should be constant (six to twelve feet wide); whereas, the portion seeded to L. bicolor (or L. syrotobotrya) should vary in width according to irregularity of original vegetative contour.

A. *Soil Preparation.* Breaking the land is not necessary, except where it has become badly baked or where grass sod is so dense that the seed can not well come in contact with the soil. In most cases merely stir or scar the land with disc harrow or scratcher, setting your machine for very shallow work. If the ground be plowed, it should be done several months before seeding so as to allow the soil to become well settled, as a firm seed bed is absolutely necessary for a sufficient and uniform stand.

A seed bed that has been prepared a couple of months in advance is highly important for the lespedezas, especially the perennials of the bush and shrub type. A short dry spell will kill young seedlings in loose ground, such as is prepared for annual crops.

B. *Seeding Methods* (Broadcast or Drill.) The seed of most lespedezas are so small as to be able to come through only as their layer of soil. The covering of the seeds can scarcely be too shallow. Suitable implements for covering seeds of serica, bicolor and syrotobotrya may be an improvised brush or pole drag, or a spike-tooth harrow set for very shallow work. Under some conditions mere rolling gives sufficient covering. Many successful plantings have been realized where the seeds were not covered at all, when planted just before a rain.

C. *Planting Time.* Planting time for the bush lespedezas may be either in Fall or early Spring, preferably in October or early March.

The recommendations above were transmitted to farmers through field technicians of each work unit. Close supervision was made of all plantings by both Soil Conservation Service field personnel and the writer so as to make certain that seed-bed preparation and seeding suggestions were carried out as near as possible.

The 2,598 pounds of L. sericea, L. bicolor and L. syrotobotrya seed with the twenty tons of 4-12-4 fertilizer were shipped to the eleven work units leaders for distribution to the cooperating farmers. Farmers receiving this material were required to sign a written agreement with the Soil Conservation Service and the Louisiana Department of Wild Life and Fisheries before receiving the material. The agreement obligated the farmer to use the material as stipulated in the agreement. Note original project statement.

FARM SELECTION: Selection of farms for the plantings was made by the Soil Conservation Service district personnel and the leader of the project.

LIMITATIONS AND REGULATIONS: The material was distributed to farmers in accordance with the following limitations and regulations:

a. Only farmers who were coöperating with the Soil Conservation Service received material.

b. No seed and fertilizer was furnished a cooperator unless he agreed to prepare an adequate seed bed and that the owner and/or cooperator of the farm had agreed in writing to give adequate maintenance of the plantings.

c. Plantings were made on strips with a minimum width of twelve to twenty feet on borders between cultivated fields and woodland, ditch banks, turnrows, terraces and fence lanes.

d. Seeding was at the rate of sixteen pounds of clean sericea seed and ten pounds of clean bicolor and syrotobotrya seed per acre. When seed were in the hull, this rate was considerably increased.

e. Mixed fertilizer (4-12-4) was used at the rate of 200 pounds per acre.

f. Cooperating farmers agreed to establish other field borders and strips on his farm as soon as adequate seed production had been obtained from the initial plantings.

Increase Seed Blocks

1. Lake Bruin:

As the state was unable to procure adequate quantities of bicolor seed for the 1944-45 program, it was obvious that the state should produce the needed supply of seed from state-owned seed blocks. A fourteen acre plot of ground was provided at the state-owned Lake Bruin Fish Hatchery for this purpose. This plot is located adjacent to the Mississippi river levee (west side) approximately four miles north of the town of St. Joseph, Tensas Parish. The land is of a silt loam and very fertile. Annual crops have been grown on the plot for the past few years, making excellent conditions for seed-bed preparation.

In early February, this plot was cleared of its heavy growth of weeds, and made ready for discing which immediately followed. The land remained for a few days in this condition after which it was harrowed. A number of heavy rains were allowed to fall on the plot before it was seeded (broadcast) in late March at the rate of fifteen pounds per acre, using no fertilizer. Seed used were 210 pounds carried over from the previous years program. Hence the heavy seed rate.

High water stages along the Mississippi river during the spring months caused seepage water to cover a small portion of the plot causing poor stands in these areas. Other than the low places flooded by water, and a few patches of bermuda grass, the stand is excellent. Due to the fertility of the soil, weed competition is exceptionally heavy, but despite this the bicolor plants continue to survive and grow. At this last observation on June 20, the plants had reached an average height of twelve to fourteen inches. Much of the height in growth no doubt was caused by shading by competing vegetation.

2. *Minden:*

The Soil Conservation Service provides this four-acre plot at their Nursery near Minden in 1941 with the expectation of supplying bicolor seed to the state's cooperative field border program. For the past two seasons, this plot was expected to supply a great portion of the needed bicolor seed for the outlined projects but due to droughts only 98 pounds of clean seed have been realized, this being produced this past season.

Prospects for seed production on this plot appear to be favorable at the time of this report. Plants are in excellent conditions, results of last year's side-dressing with 4-12-4 fertilizer and cultivation—this stand was planted in drill by seedlings. With proper seasons, this four-acre plot should produce approximately 1,200 pounds of clean seed per year.

Old Stands of Lespedeza Sericea

It is much in evidence that three and four year old field border stands of sericea are proving to be of great value in maintaining adequately quail population on farms of the state. Though it is not apparent that the bobwhite uses this plant as a source of food, it does utilize it rather extensively as cover both during the breeding season and through the fall and winter months. Numerous nests are reported each season by cooperating farmers. These reports are substantiated by the project leader by frequent field cruises, making sure these reports are more or less accurate.

Maintenance of the wildlife borders have proven satisfactory on the majority of farms. However, some farmers have used them as hay and meadow strips rather than maintaining them for wildlife but this practice is rather negligible. Three and four year old borders which have been allowed to burn in late winter and early spring seem to provide better conditions for quail habitation than those which did not burn. Burning does not affect the stand in the least, but appears to increase growth by adding fertility to the soil. Cumulated litter from year to year, caused by falling folage is also removed when burned, destroying inviting conditions for the destructive cotton rat.

Partial spread and increase of stands are realized each year from reseeding. The spread caused by wind and rain is rather of minor importance due to its limited extent. Some seed are transported by water along drainage ditches and allowed to produce excellent stands along the ditch banks.

Old Stands of Lespedeza Bicolor
(Results of 1943-44 program)

An extended drought in some portions of the state caused many of the excellent stands to suffer considerably but not to the extent of complete destruction. These partial stands have been allowed to remain and without further hindrance these few plants will prove to make a satisfactory stand for wildlife usage. In areas where there was sufficient rain, stands are in excellent conditions and some seed will be produced this season.

Cooperating farmers are highly pleased in the progress of this plant, and are fast realizing its importance as a valuable agent in erosion control and wildlife management. The present demand for bicolor seed for field workers is greater than the state can supply, hence the importance of the state planting its own seed increase blocks.

New Stands (1944-45 program)

At the date of this report all stands of L. sericea, bicolor and syrotobotrya are progressing in fine shape. No ill effect has been caused by the lack of rain or the excess of rain. Growth varies from three to eighteen inches depending on the nature of the soil. In most cases weed competition is heavy but no retardations is found in the growth of either of these three plants. Bermuda grass appears to be the strongest competing vegetation.

As a whole, the 1944-45 program has been successful and will prove its value in the next few years to follow.

The following is the extent of participation of the Soil Conservation Service for the 1945 field-border program:

1945 PROGRAM

WORK UNIT	Lbs. Rec'd—Seed			Lbs. Planted—Seed			Fert. Rec.	Fert. Used	Acres Plant	Farms Participate
	Sericea	Bicolor	Syro.	Sericea	Bicolor	Syro.				
Ruston (McCallum)	160	63	60	160	63	60	4000	4000	18	10
Ruston (Spencer)	25	25	25	25	25	25	800	800	3	3
Plain Dealing	240	85.5	0	240	85.5	0	3000	3000	23	30
Jena	0	85.5	0	0	85.5	0	1500	1500	10	14
Winnfield	176	0	145	176	0	13	4400	2400	13	13
Farmerville	176	64	64	176	64	64	4400	4400	23	9
Ringgold	192	0	250	192	0	250	4800	4800	26	16
Calhoun	192	63	79	192	63	63	4800	4800	15	10
Many	240	85	0	240	85	0	3000	3000	15	10
DeRidder	80	60	50	80	60	50	2000	2000	10	9
Bastrop	192	63	79	192	63	79	4800	4800	24	18
TOTAL	1673	594	752	1673	594	604	37500	35500	180	132

Respectfully submitted,

JOHN S. CAMPBELL,
Project Leader.

Approved:

MAJOR JAMES BROWN, *Director,*
Fish and Game Division

STATE: Louisiana
PROJECT NUMBER: 2-R
DATE: July 1, 1945

ANNUAL PROGRESS REPORT QUAIL RELEASE INVESTIGATION

As Required By

FEDERAL AID IN WILDLIFE RESTORATION ACT

INTRODUCTION

The purpose of this project is to obtain information on the feasibility of a restocking program by liberating pen-reared bobwhite quail on depleted areas.

This project was undertaken by selecting study areas of 1,500 to 2,500 acres of semi-farmed and non-farmed land located in various sections of the state which were comparable to the state as a whole. The project is set up for a duration of three years 1945-48 with two release periods per year, one in Spring and one in the Fall. Two field biologists, Carroll Perkins and Rowland Vernon, are in charge of all field activities each selecting three study areas in sizes mentioned above. These areas are located in parishes of Jackson, Union, Morehouse, Acadia, Beauregard, and Vernon.

In making the two releases each year on each of the study areas, birds are to be secured from the state hatcheries. The 250 quail to be released on the areas at each planting are weighed and banded before leaving the hatchery. When released, the biologist makes close field observations for three weeks following the release date. All field data is recorded and compiled at the close of each year's work in the form of a summary report.

Due to being called to the armed forces, Carroll Perkins was forced to discontinue the field work begun in Acadia, Beauregard, and Vernon Parishes. A Summary Report was prepared and submitted by Perkins of the work done in these parishes prior to his report for military duty—March 1, 1945. A Summary Annual Report of the work done by Vernon in the parishes of Jackson, Union, and Morehouse has been submitted.

TRAPPING

To obtain definite information as to movements, weight, and fusing of the released birds with native birds, trapping was attempted by the biologist, using Stoddard's standard quail trap. The trapping period ranged from six to seven days on each of the study areas once each four weeks from October to February. Only little success was realized from trapping during this period by Vernon and no results were obtained by Perkins.

PREDATION

Field observations proved that heavy losses of released birds were caused by predation, foxes, and hawks taking the greatest number. Opening of the hunting season (December to February 20) resulted in the loss of a relatively few released birds on the study areas. In some instances where released quail were taken by hunters, it was rather difficult to secure the leg band due to the hunter's fear of some legal penalty.

CENSUS

The first work undertaken by the biologist on the selected study areas was to secure information regarding the present native stock within the boundaries of the area. To do this it was necessary to use various means. During late summer the areas were well covered on foot and all evidence of the presence of quail was recorded. In early Fall, as soon as the weather was cool enough to use dogs, each area was checked by trained dogs and the location of native coveys recorded. The locations of these coveys were indicated on a map of the area which was prepared by the biologist.

In making releases of pen-reared quail, on both Fall and Spring releases caution was taken not to plant the new coveys less than one-half mile from the native coveys so as to avoid mixing of native and released birds. In this manner, it was hoped to make a thorough study of only the released birds. However, after several weeks, it was found that the wild birds did mix with the released coveys. It could not be determined whether the native birds mixed with the released birds or the released birds joined the native coveys. This mixing was discovered after a few weeks of trapping.

Census work in later summer, in some cases, showed that no birds were present on portions of the study areas but later in fall and winter, native coveys moved on to the area. This was particularly true in Jackson and Union Parishes. In making further investigations as to the movement of the native birds, it was noticed that coveys found on the study area in the fall census would move from the original location to new locations. The released coveys had the same tendency to move from one location to another but not to the extent of distance as the native coveys.

The census work in winter was done exclusively with trained dogs and with a much higher degree of success. Native and released birds were found to remain about the same in number but their location would change from one quarter to one mile. The number of birds per covey would fluctuate, and in most instances the coveys seemed to grow smaller as the winter months advanced.

VALUE OF JOB SHEET

In the methods and procedure of this project, it was found that a well organized plan of work in the form of a job sheet was exceedingly helpful. This job sheet was prepared and placed in the hands of each biologist at the beginning of the project—making it possible for him to be thoroughly familiar with the program before the work got underway. Each unit of work was stipulated on the job sheet in chronological order, giving the date and time of each activity. This arrangement facilitated the progress of all field work and gave the biologist a well organized outline of procedure. It is the intention of the leader to keep a well organized plan of work in the hands of the biologists through the entire duration of this project. A job sheet not only expedites the activities, it gives a greater efficiency and a higher quality of work.

COMPARISON OF REPORT

In making a general comparison of the report prepared by Vernon and the one prepared by Perkins, it must be borne in mind that the two reports were made from field notes obtained under two different circumstances.

The report prepared by Perkins was made from field notes obtained from only eight months of work and that prepared by Vernon was the result of a whole year's work. On short notice, Perkins was notified to report for military duty and within a period of three weeks he prepared this report including the maps which are attached. He did not have sufficient time to compile his data in the form of tables or did he have the opportunity to follow his work through to the conclusion of the year. This report must be considered as a tentative report for the work done by Perkins and not as an Annual Progress Report.

The report prepared by Vernon is an Annual Progress Report consisting of data obtained through the first year's work on the project. The information obtained is arranged in table and narrative form including the charting of maps. This report contains a vast amount of valuable information arranged in a comprehensive manner. As the project proceeds, improvement on quarterly and annual reports is expected. The amount of data to be gotten from a project of this type cannot be anticipated but the arrangement of information obtained into an annual report can be expected to improve.

Respectfully submitted,

JOHN S. CAMPBELL,
Project Leader.

STATE: Louisiana
PROJECT NUMBER: 2-R.
DATE: June 30, 1945.

SUMMARY PROGRESS REPORT QUAIL RELEASE INVESTIGATIONS
As Required By
FEDERAL AID IN WILDLIFE RESTORATION ACT

Supervisors: Major John G. Appel, Commissioner, Department of Wild Life & Fisheries
Major James Brown, Director, Fish and Game Division
Leader: John S. Campbell.

Summary Report of Progress, Northeast District:

Field Biologist: Roland P. Vernon, Ruston, Louisiana.
Project areas in Jackson, Union and Morehouse Parishes.

This summary report is of the field investigation carried on from July 1, 1944 to June 30, 1945, in the Northeast District of Louisiana. The investigation was carried on under the auspices of Federal Aid to the State Wildlife Investigation and Restoration Program.

The objectives of the program were: To secure data on behavior of pen-raised quail compared with wild birds; To secure data on survival up-to-date of birds released;

To inaugurate a planned method of field investigation; and to develop field technique in methods of enumerating, trapping, and making field observations.

With these objectives in mind, three representative types of environment suitable for quail propagation in northeast Louisiana were obtained. They are:

1. The hilly, north Louisiana country of small farms with diversified agriculture and characterized by Pine-Oak-Hickory forest.
2. The Cutover Shortleaf Pine lands from which the timber has been removed, and is not carrying as high a quail population as it should.
3. The fertile farm lands of the Alluvial Soils with hardwood timber, intensively farmed, but the farms are not of the large plantation type, and the quail carrying capacity of the region is fairly good.

These study areas varied from approximately twenty-six hundred (2600) to twenty-nine hundred (2900) acres in size. On these study areas twelve (12) coveys of pen-raised quail, containing twenty (20) birds (10 males and 10 females) each, twelve (12) to fourteen (14) weeks old were liberated in the fall, and thirteen (13) to fourteen (14) coveys of six adult birds (3 males and 3 females) were released in the spring. The behavior and survival of these birds were studied by field observation. This investigator was equipped with an automobile, dogs, traps, trailer, horse, binoculars, camera, and balance scales. To inaugurate a planned method of field investigation, a job sheet was drawn up by the Regional Inspector and Project personnel.

Project D-1

The preliminary work of locating an investigation area in the hilly north Louisiana country of small farms of diversified agriculture and Pine-Oak-Hickory forest was begun in August of 1944. After examining several areas a suitable tract was found near Lillie, Louisiana.

This tract located approximately two miles west of Lillie, bound on the north, east, west and a greater portion of the south by parish highways. The other portion of the southern boundary is a property division fence. This area contains approximately twenty-nine hundred acres of land. The topography of the area is very rolling and frequently cut-up with small intermittent streams. There are patches of Loblolly Pine, Oak and Hickory forest in between cultivatable fields. Many of these fields are fallow at the present time. The area provides excellent cover and food, with native lespedezas and beggar weed in abundance. Many berry producing shrubs are located on the area also.

The control area, containing approximately 2450 acres, similar in all respects, was located near Crossroads. These project areas henceforth will be designated thus: The experimental area as D-1 and the control area as D-2.

Maps of these areas were obtained from the Soil Conservation Service. A census of the experimental area and control area was made in the fall before releases and again in March 1945. This was obtained by hearing morning and afternoon whistling periods and with aid of bird dogs.

The areas were subject to normal hunting and work carried on as secretly as possible.

RELEASE OF PEN-RAISED QUAIL

Record of releases of pen raised quail on project D-1

Date of Release	Number Liberated	Age	Conditions When Released
Sept. 22, 1944...........	240	12-14 weeks	Hot and moderately dry; low population of native quail; food and cover excellent; pen raised quail in good condition.
April 13, 1945..........	84	adult	Cool and damp; low population of wild birds; food and cover good; pen raised birds in excellent condition.

The birds released in the fall were marked with an aluminum band, serially numbered, weighed, and their tail feathers marked with a paint at the hatchery.

The spring released quail were marked with an aluminum band, serially numbered, and weighed at the hatchery. These birds were not marked with a paint because this practice proved very unsuccessful during the fall release.

The fall release was made in coveys of twenty (20) birds (ten (10) male and ten (10) females) while the spring release was made in coveys of six (6) birds (3 males and 3 females.) All releases were made in the early morning hours being completed by ten o'clock in both instances. Releases were made by letting the quail walk quietly out of the boxes into cover instead of flushing wildly. Immediately after release, the birds began feeding at random with seemingly no food preference. Released birds were observed closely over a period of a week immediately following liberation.

OBSERVATIONS OF QUAIL ON PROJECT AREA

Fall Release:

During the first period of observation, September 22 to September 30, 1944, these birds were very tame and flew only after great effort on the part of this Biologist to frighten them. Their flight was very erratic and immediately after alighting would begin to whistle. Very little covey instinct was shown by the pen raised birds as evidenced by observation of their feeding periods and by droppings where they had roosted. In feeding alertness to danger was not evident and did not roost in a group.

Very little movement in distance from release points was noticed during this period.

Data on D-1 area—September 22 to September 30, 1944:

Covey No.	No. Birds Per Covey	Dec. at End of Obser. Period	Cause of Decrease	Distance of Movement (see map D-1 from release point at end of period) in miles approximately.
I	20	0		1/16
II	20	0		1/8
III	20	0		1/4
IV	20	0		1/8
V	20	0		1/16
VI	20	0		3/16
VII	20	0		3/32
VIII	20	0		1/8
IX	20	0		1/8
X	20	0		1/8
XI	20	0		1/16
XII	19	1	Fox	1/16

There did not seem to be a concentration of predators on this area at the time of release or observation period.

The second visit to this area was made in the latter part of October, seven days were spent on the project area. The pen raised quail were reverting to a great extent back to their wild instincts. It is thought by this Biologist, that at this time the pen raised quail had to some degree intermingled with the native population judging from the difference in flight of individuals in the coveys.

Coveys of quail were near release points, but due to dense vegetation bands were not distinguished, and trapping was unsucessful therefore it cannot be ascertained as to whether or not these coveys were composed of pen raised quail.

Data on D-1 area—October 26 to November 1, 1944:

Covey No.	Est. No. Birds Per Covey	Dec. from End of One Obser. Period to End of Present Period	Cause of Decrease	Distance of Movement from last obser. period to end of present period, in miles approx. See map D-1
I	19	1	Unknown	1/4
II	20	0		0
III	20	0		0
IV	18	2	Unknown	3/16
V	17	3	Unknown	1/4
VI	20	0		0
VII	18	2	Unknown	3/16
VIII	20	0		1/4
IX	20	0		5/16
X	19	1	Unknown	0
XI	16	4	Unknown	1/4
XII	18	2	Unknown	3/16

Causes of Decreases were not known as no carcasses were found nor was there any sign of predator activity.

The next trip to Project D-1 was made during the latter part of November 1944. Six days were spent on the project area. With aid of dogs, quail were found near all release points during the observation period.

Data on D-1 area—November 24 to November 30, 1944:

Covey No.	Est. No. Birds Per Covey	Dec. from End of Last Obser. Period to End of Present Period	Cause of Decrease	Distance Traveled from last obser. period to end of present period. See map D-1
I	16	3	Unknown	1/8
II	18	2	Unknown	1/4
III	17	3	Unknown	3/16
IV	15	3	Unknown	3/16
V	17	0		0
VI	17	3	Unknown	1/4
VII	17	1	Unknown	5/16
VIII	16	4	Unknown	1/4
IX	20	0		3/16
X	14	5	Unknown	1/8
XI	13	3	Unknown	1/4
XII	16	2	Unknown	1/4

There was no available evidence for cause of decrease.

As during the previous period, bands were not distinguishable on quail due to vegetation, and as trapping was unsuccessful the presence of pen raised quail in the above coveys cannot be definitely stated. However, from the flight of individuals in the coveys it is this Biologist's belief that the coveys do contain some pen raised quail.

The next visit was made to project D-1 the third week of December 1944. Two dogs were used in locating quail on the project area. Seven days were spent on the project area. Quail were found near the fall release points during the observation period.

Covey No.	Est. No. Birds Per Covey	Dec. from End of Last Obser. Period to End of Presest Period	Cause of Decrease	Distance Traveled from last obser. period to end or present period in miles. See map D-1
I	13	3	Hunters	1/4
II	16	2	Unknown	1/8
III	12	5	Hunters	1/16
IV	14	1	Unknown	3/16
V	17	0		5/16
VI	15	2	Hunters	0
VII	16	1	Housecat	1/8
VIII	12	4	Hunters	1/8
IX	17	3	Hunters	5/16
X	11	3	Hunters	1/4
XI	10	3	Hunters	3/16
XII	15	1	Housecat	1/4

Efforts to establish the identity of the above quail as pen raised quail, altogether or in part were in vain, as trapping was unsuccessful and no bands were sighted. There was no available evidence for cause of decrease in some of the coveys.

The next visit to this vicinity was made the last of January 1945. Six days were spent on the project area. Dogs were used in locating birds near release points. However, only ten (10) coveys were located during the period. Data on D-1 area—January 23 through January 29, 1945:

Covey No.	Est. No. Birds Per Covey	Dec. from End of Last Obser. Period to End of Present Period	Cause of Decrease	Distance Traveled from last obser. period to end of present period in miles. See map D-1
I	Not Located During Period			
II	13	3	Fox	0
III	12	0		3/16
IV	10	4	Hunters	5/16
V	17	0		0
VI	9	6	Hunters	1/8
VII	12	4	Hunters	1/2
VIII	10	2	Unknown	3/16
IX	16	1	Owl	1/2
X	Not Located During Period			
XI	3	7	Hunters	1/4
XII	11	4	Hunters	0

Two coveys (VI and XII) of the ten located and observed contained pen raised quail. Six bands were obtained from hunters who were checked on the project area. Trapping was unsuccessful, and no bands were sighted on any of the birds. Decrease in number of quail is attributed to heavy hunting at this time and to predators. No evidence was available for the cause of decrease in some of the coveys.

The next visit to this section was made during the last of February. Six days was spent on this area. Dogs were used in locating coveys. During the obesrvation period nine (9) coveys of quail were located.

Data on project D-1—February 21 to February 27, 1945:

Covey No.	Est. No. Birds Per Covey	Dec. from End of Last Obser. Period to End of Present Period	Cause of Decrease	Distance Traveled from last obser. period to end of present period in approx. miles. See map D-1
I	7	6	Unknown	0
II	12	1	Fox	1/8
III	6	6	Fox	1/8
IV	9	3	Fox	1/2
V	17	0		1/16
VI	6	3	Fox	1/16
VII	10	3	Fox	1/8
VIII	8	2	Unknown	1/4
IX	14	2	Unknown	3/16
X	Not Located			
XI	Not Located			
XII	Not Located			

One covey of the nine located was known to have five banded birds, seventeen were trapped February 24, 1945, and of the seventeen—five were banded birds. No evidence was available as to the cause of most decreases.

The last visit to the area before the spring release was made late in March. Seven days were spent on the area. On this visit only nine coveys were located with the aid of dogs.

Data on D-1—March 24 to March 31, 1945:

Covey No.	Est. No. Birds Per Covey	Dec. from End of Last Obser. Period to End of Present Period	Cause of Decrease	Distance Traveled from last obser. to end of present period in miles. See map D-1
I	7	0		1/8
II	12	0		3/16
III	6	0		1/8
IV	9	0		0
V	11	6	Unknown	5/16
VI	6	0		3/16
VII	10	0		0
VIII	Not Located			
IX	14	0		1/8
X	3	0		3/16
XI	Not Located			
XII	Not Located			

During this period eight (8) of the nine (9) coveys located were trapped. Of the eight coveys trapped only one covey had any banded birds in it; in covey No. 1 five out of seven birds were banded.

SPRING RELEASE

Observations of the spring released quail were made every other day from April 13 through April 23, 1945. The released birds actions were much the same as those released in the fall. However, their flight was much more erratic. Some hardly able to fly at all, and most birds had a tendency to travel in pairs when feeding. Movement was made only by two coveys, No. 14 and No. 13 had merged at a point approximately halfway between release points (see map D-1). At the end of the period all coveys were intact.

Data on D-1—April 16, 18, 20, 23, 1945:

Covey No	No. Birds Per Covey	Death & Cause	Approx. Distance from Release Point in Miles. See map D-1
1	6	0	0
2	6	0	1/32
3	6	0	1/16
4	6	0	1/32
5	6	0	0
6	6	0	3/16
7	6	0	1/8
8	6	0	0
9	6	0	0
10	6	0	1/16
11	6	0	0
12	6	0	3/16
13 and 14 (merged)	12	0	1/4

During the latter part of the observation period one cock had gained leadership of his respective covey.

During the second and third trips, May 7 through May 12, 1945, respectively, no coveys were found. One carcass with leg band number q968 had been caught by a fox during the time lapse between the first and second visits, one half mile from release point, a few days before the second visit. No coveys of quail were located, but numerous pairs were observed during the second visit and judging from their flight one or both in several instances were pen raised quail. During the third visit a few pairs and several cock birds were observed.

TRAPPING

Trapping attempts were begun late in October 1944, using Stoddard's standard quail trap. (see figure 50 pp. 443, THE BOB WHITE QUAIL, and a home-made trap constructed of wood slats approximately 1″ x 1″ x 36″, in a box-like form, unfloored and held together with a bow-shaped slat. The opening is a trench dug in the ground extending under the trap and a board ½″ x 6″ x 18″ placed over the trench inside the trap.

Trapping sites were determined by listening to early morning whistling of the quail and with the aid of dogs.

Trapping Procedure:

A. Traps were set under the following conditions—

1. Placed traps on sites, approximately twelve square feet, that had been cleaned off.
    a. Traps were propped up off the ground for a three or four day period; then lowered them into trapping position.
    b. Placed traps in trapping position at the start of trapping period.
2. Placed traps on sites under natural conditions that is; not cleaning off sites.
    a. Traps were propped up off the ground for a three or four day period; then lowered into trapping position.
    b. Placed traps in trapping position at start of trapping period.

B. Trapping periods.

Trapping periods ranged from six to seven days on each project area once each month.

C. Bait

1. Whole grain corn was used extensively on projects D-1 and E-1.
2. Whole grain corn and soybeans were used singularly and in a mixture on project F-1.

D. Results

1. From late October 1944 until after the middle of February no birds were caught.
2. Trapping results and information compiled are as follows:

Date	Total No. Birds Trapped	Band Nos. of Birds	Distance from Release Point in Miles	Wt. When Released in Ounces	Wt. Gained in Ounces
2/24/45	31	507	1/4	4 1/4	1 3/4
		508	1/4	4 9/16	1 15/16
		515	1/4	4 3/8	2 3/16
		517	1/4	4 9/16	1 9/16
		520	1/4	4 1/2	2 1/4
3/28/45	20	0			
3/30/45	52	541	1/4	4 1/4	2 5/16
		543	1/4	4 3/16	2 3/16
		549	1/4	4 1/16	2 1/16
		557	1/4	4 5/16	2
		558	1/4	4 1/16	2 3/8

All birds trapped were taken in the standard quail trap, and when traps were set under natural conditions. Little difference was noted in whether or not the trap was propped up or placed in the trapping position at the start of the trapping period.

BAND COLLECTION

Thirty-five bands were obtained from hunters some who were checked hunting on project areas and others who turned bands in to the game agent of the parish. Information obtained concerning most bands was meager. All band collections were from fall release of quail with the exception of one, band number q968, one of the spring released quail. Data compiled from band collection:

Band No.	Date Killed	Wt. in Ozs. When Released	Wt. Gained in Ounces	Approx. Distance Traveled from Release Point in Miles
222	1/25/45	4 1/2	1 3/4	1/2
223	1/25/45	4 3/16	2 1/4	1/2
282	1/25/45	4 1/16	2 3/4	1/4
2481	1/27/45	4 3/16	1 3/4	1/4
2 2495	1/27/45	4 1/4	1 3/4	1/4
202	1/27/45	4 3/16	2 1/2	3/4
4864	1/27/45	No Record of This Band in Either Release		
491	Jan./45	4 1/4	Other Information Not Available	
270	Jan./45	4 3/16	“ “	“ “
296	Jan./45	4 1/16	“ “	“ “
2494	Jan./45	4 1/2	“ “	“ “
581	Jan./45	4 3/8	“ “	“ “
276	Jan./45	4 1/4	“ “	“ “
2493	Jan./45	4 1/8	“ “	“ “
267	Jan./45	4 5/16	“ “	“ “
2488	Jan./45	4 1/4	“ “	“ “
274	Jan /45	4 1/8	“ “	“ “
593	Jan./45	4 3/16	“ “	“ “
534	Jan./45	4 1/16	“ “	“ “
266	Jan./45	4 1/8	“ “	“ “
2496	Jan./45	4	“ “	“ “
516	Jan./45	4 3/8	“ “	“ “
264	Jan./45	4 3/16	“ “	“ “
2486	Jan./45	4 1/16	“ “	“ “
2492	Jan./45	4 1/4	“ “	“ “
285	Jan./45	4 3/8	“ “	“ “
565	Jan./45	4 3/16	“ “	“ “
487	Jan./45	4 3/16	“ “	“ “
236	Jan./45	4 1/16	“ “	“ “
218	Jan /45	4 5/16	“ “	“ “
495	Jan./45	4 1/4	“ “	“ “
286	Jan./45	4 3/16	“ “	“ “
240	Jan./45	4 1/8	“ “	“ “
599	Jan./45	4 1/16	“ “	“ “
488	Jan./45	4 3/8	“ “	“ “
*q968	5/8/45	5 26/32	0	1/2

* This bird released in the spring was eaten by a fox ½ mile from the release point.

Note: Weights obtained in the field are subject to variations due to the sensitiveness of the balances used to the slighest breeze, and also birds that were shot contained some lead.

CENSUS FINDINGS:

Proj. Area	Preliminary Census No. of Quail	Spring Census No. of Quail	Acres Per Bird	
			Fall	Spring
D-1	70	78	41 4	37.2
D-2	67	53	35.8	45.3

Of the seventy-eight birds located on project D-1 area only five of the quail are known to be pen raised quail. This information was obtained through March trapping of this area.

PROJECTS E-1 AND E-2

The preliminary work of locating an investigation area in the cutover timberland of the shortleaf pine, was begun in late September and completed early in October 1944, after several tracts had been inspected.

This area located about one and a half miles South of Kelly's Store and four miles north of Old Vernon, is bounded on the west side by the Ruston-Chatham highway and on the north and east sides by graded country roads and on the south by an imaginary line drawn from a point on the southeast boundary to the Ruston-Chatham highway. This area contains approximately twenty-six hundred acres of land. The topography is very much like the area of project D-1—very rolling and cut up frequently by small intermittent spring fed branches. This area provides excellent food and cover. Native legumes are in abundance and most of pine and hardwood is available. Also, berry producing shrubs are located on the area.

The control area containing approximately twenty-nine hundred acres; and similar in all respects was located west of the project area approximately seven miles.

These project areas will henceforth be designated as—The experimental area as E-1 and the control area as E-2. Maps of these areas were obtained from the Triple A and the Soil Conservation Service.

A census of the experimental area was made in the fall before releases were made and again in March. This was obtained by listening to the morning and afternoon whistling period and where possible with the aid of bird dogs.

The areas were subject to normal hunting and work carried on as secretly as possible:

Releases of pen raised quail:

Record of releases of pen raised quail on Project E-1

Date of Release	No. Liberated	Age	Conditions When Released
Oct. 19, 1944	240	12-14 wks.	Cool and Dry; low population of native quail; food and cover excellent; pen raised quail in good condition.
April 13, 1945	78	Adult	Cool and damp; medium population of native quail; food and cover good; pen raised quail in good condition.

The birds for fall and spring release on project E-1 were prepared at the hatchery in the same manner as birds for release on project D-1.

Liberated quail were observed closely over a period of a week immediately following liberation.

OBSERVATION OF QUAIL ON PROJECT AREA

Fall Release:

The first period of observation on project area was from October 19 through October 25, 1944. The liberated quail were very tame and flew only after repeated efforts to frighten them. The flight of the liberated quail was very erratic and immediately after alighting began to whistle. Little covey instinct was shown by liberated quail as evidenced by observations of their feeding periods and by droppings where they had roosted. In feeding they were not as alert to danger as the native quail and did not roost in a group as wild quail.

Data on E-1 Area—October 19 through October 25, 1944:

Covey No.	No. Birds Per Covey	Dec. at End of Obser. Period	Cause of Dec.	Approx. Distance of Movement from Release points in Miles (see map E-1)
I	20	0		1/16
II	20	0		0
III	20	0		0
IV	20	0		0
V	20	0		1/8
VI	20	0		1/4
VII	20	3	Unknown	1/4
VIII	20	0		0
IX	20	0		3/16
X	20	0		1/16
XI	20	0		0
XII	20	1	Fox	1/8

Cause of decrease was not known because there was not any evidence available. Predators are not concentrated over any part of this area.

The second visit to this area was made during the first part of December 1944. Quail were located during this visit by listening to the morning and afternoon whistling periods and also with the aid of bird dogs. Birds ran from dogs and paid little attention to type of cover while doing so. It is thought by this Biologist that the liberated quail had merged with wild quail due to difference in the flight of various individuals in coveys. The flight of some individuals was very erratic like pen raised quail, and the flight of others was in the manner of wild birds. Twelve coveys were located near release points, but efforts to determine definitely whether or not they were liberated quail were unsuccessful because trapping was unsuccessful and the inability to sight bands on quail legs due to vegetation.

Data on E-1 Area—December 4 through December 9, 1944:

Covey No.	Est. No. Birds Per Covey	Dec. From End of Obser. Period to End of Present Period	Cause of Decrease	Approx. Distance of Movement from Last Period to End of Present Period in Miles. See map E-1
I	18	2	Housecat	1/4
II	14	6	Hunters	1/16
III	17	3	Unknown	1/8
IV	15	5	Hunters	1/4
V	16	4	Hunters	3/16
VI	16	4	Hunters	5/16
VII	12	5	Hunters	1/8
VIII	17	3	Hunters	1/4
IX	18	2	Unknown	1/2
X	14	6	Hunters	3/16
XI	15	5	Hunters	1/16
XII	15	4	Unknown	1/4

Evidence was not available on cause of decrease in all coveys. Hunters were checked on project area on three different days, but no banded birds were taken.

The next visit to this area was made during the middle of January 1945. Nine days were spent on the project area. Dogs were used in locating coveys as well as hearing the morning and afternoon whistling periods. Nine coveys of quail were located during the period.

Data on E-1—January 10 through January 19, 1945:

Covey No.	Est. No. Birds Per Covey	Dec. From End of Last Obser. Period to End of Present Period	Cause of Decrease	Approx. Distance Traveled from Last Obser. Period to End of Present Period in Miles. See map E-1
I	14	4	Hunters	1/8
II	14	0		3/16
III	10	7	Hunters	3/16
IV	13	2	Hunters	3/16
V	14	2	Hunters	0
VI	16	0		0
VII	9	3	Hunters	1/16
VIII	Not Located			
IX	12	6	Hunters	0
X	Not Located			
XI	Not Located			
XII	15	0		3/16

Three of the nine coveys located (Nos. I, V and IX) contained pen raised quail. Three bands were obtained from hunters, who had hunted on the project area.

Trapping was unsuccessful and no bands were sighted on the legs of quail.

The next trip to this area was made during the middle of February 1945. Seven days were spent on the area. Coveys were located by morning and afternoon whistling periods and with aid of dogs. Nine coveys of quail were located during the period.

Data on E-1—February 12 through February 20, 1945:

Covey No.	Est. No. Birds Per Covey	Dec. from Last Period of Obser. to End of Present Period	Cause of Decrease	Approximate Distance Traveled from Last Obser. Period to End of Present Period in Miles. See map E-1
I	14	0		1/8
II	8	5	Hunters	0
III	10	0		1/16
IV	9	4	Hunters	1/16
V	14	0		1/8
VI	7	9	Hunters	1/4
VII	9	0		0
VIII	Not Located			
IX	12	0		1/8
X	Not Located			
XI	Not Located			
XII	9	6	Hunters	1/16

Two of the nine coveys located had banded birds in them. These two coveys (Nos. I and III) were trapped on February 14 and 17, respectively. Hunters were checked on this area the last of quail season and five bands were obtained.

The next visit to this area was made during the middle of March 1945. Six days were spent on the area. Coveys were located with the aid of bird dogs and by listening to the morning and afternoon whistling periods. Ten coveys were located during the period.

Data on E-1—March 16 through March 23, 1945:

Covey No.	Est. No. Birds Per Covey	Dec. from Last Obser. Period to End of Present Period	Cause of Decrease	Approximate Distance Traveled from Last Obser. Period to End of Present Period in Miles. See map E-1
I	14	0		1/4
II	8	0		1/32
III	10	0		1/8
IV	9	0		0
V	14	0		1/4
VI	7	0		1/16
VII	9	0		1/8
VIII	10	7	Unknown	1/4
IX	12	0		1/4
X	Not Located			
XI	Not Located			
XII	9	0		0

No evidence was available for the decrease in covey No. VIII. This covey was located for the first time since the observation period during December 1944.

Six (Nos. I, IV, V, VI, VIII, and IX) of the ten coveys were trapped during this period and out of a total of sixty-six birds trapped only one covey, No. V, contained banded birds. Only two of these were banded.

SPRING RELEASE

Observations of the spring release quail were every other day following liberation of the pen raised quail. The The actions of the liberated quail were much the same as the spring release quail on project D-1.

Data on E-1 area—April 14, 17, 19, and 21, 1945:

Covey No.	No. Birds Per Covey	Dec. & Cause	Approx. Distance from Release Point in Miles. See map E-1
1	6	0	1/16
2	6	0	1/4
3	6	0	1/8
4	6	0	0
5	6	0	3/16
6	6	0	1/16
7	6	0	1/32
8	6	0	0
9	6	0	1/16
10	6	0	0
11	6	0	1/32
12	6	0	1/8
13	6	0	0

During the latter part of the observation period it was observed that one cock bird had gained leadership of each covey.

During the second and third visits, May 14 through May 19, 1945 and June 6 through June 11, 1945 respectively no coveys were found but numerous pairs were observed that judging from their flight one or both in several instances were pen raised quail.

TRAPPING

Trapping attempts were begun on this project area in December 1945, using same type traps and the same methods as stated in trapping on project D-1.

The first birds trapped were caught February 14, 1945. Results and information compiled are as follows:

Date	Total Birds Trapped	Band Nos. of Birds	Distance from Release Point in Miles	Wt. When Re-Leased in Ozs.	Wt. Gained in Ounces
2/14/45	13	352	1/4	4 7/32	2 5/16
		357	1/4	4 3/8	2
		358	1/4	4 9/16	2 1/8
2/17/45	30	335	1 3/4	4 5/16	2 1/4
3/30/45	8	0			
3/21/45	42	313	1/4	4 1/8	2 5/8
		317	1/4	4 1/32	2 5/8
3/23/45	16	0			

All birds trapped were caught in the standard quail trap, and when traps were set under natural conditions. Little difference was noted in whether or not the trap was propped up or placed in trapping position at the start of the period.

BAND COLLECTION

Thirty-five bands were obtained from hunters, some who were checked on project area and others who were contacted or turned bands in. An additional eighteen banded birds were killed by negro hunters who were afraid to turn them in for fear they had committed some offense. All bands collected were from fall release.

Data compiled on band collection:

Band No.	Date Killed	Wt. When Released in Ozs.	Wt. Gained in Ozs.	Approx. Distance Traveled from Release Point in Miles.
305	1/10/45	4 3/16	2	3/4
341	1/10/45	4 1/4	1 3/4	1/4
646	1/10/45	4 1/32	2 1/2	3/8
350	2/20/45	4 1/2	2	1/4
355	2/20/45	4 5/16	1 3/4	1/4
337	2/20/45	4 3/16	2 1/2	3/8
344	2/20/45	4 1/4	1 3/4	1/4
351	2/20/45	4 3/8	2 1/2	1/4
663	Jan./45	4 3/16	Other Information Not Available	
637	Jan./45	4 1/4	" " " "	
703	Jan./45	4 1/8	" " " "	
686	Jan./45	4 1/8	" " " "	
623	Jan./45	4 1/4	" " " "	
304	Jan /45	4 7/32	" " " "	
656	Jan./45	4 1/16	" " " "	
673	Jan./45	4 1/8	" " " "	
678	Jan./45	4 3/16	" " " "	
704	Jan./45	4 1/4	" " " "	
624	Jan./45	4 3/8	" " " "	
697	Jan./45	4 1/16	" " " "	
711	Jan./45	4 3/16	" " " "	
626	Jan./45	4 1/4	" " " "	
306	Jan./45	4 1/4	" " " "	
653	Jan./45	4 1/8	" " " "	
682	Jan./45	4 3/16	" " " "	
652	Jan./45	4 1/16	" " " "	
642	Jan./45	4 3/32	" " " "	
661	Jan./45	4 3/8	" " " "	
676	Jan./45	4 5/16	" " " "	
665	Jan./45	4 3/16	" " " "	
641	Jan./45	4 1/8	" " " "	
603	Jan./45	4 3/16	" " " "	
660	Jan./45	4 1/8	" " " "	
631	Jan./45	4 3/32	" " " "	

Note: Weights obtained in the field are subject to variations due to birds that were shot contain some lead, and the sensitiveness of the balances used to the slightest breeze.

Proj. Area	Preliminary Census No. of Quail	Spring Census No. of Quail	Acres Per Quail	
			Fall	Spring
E-1	67	78	37.4	33.3
E-2	77	61	38.3	48.3

Of the seventy-eight (78) quail located on project E-1 area, only two were known to have bands. This information was obtained through March trapping on this area.

PROJECTS F-1 and F-2

The preliminary work of locating an investigation area in the fertile farm land of the alluvial soils with hardwood timber, intensively farmed, but not of the large plantation type, was begun in October 1944 and completed early in November 1944, after many areas had been inspected.

This area located approximately one mile east of Collinston, Louisiana, is bound on the west side by the Missouri Pacific Railroad lines, on the north and south sides by parish graded roads and on the east side by an old slough and part by a parish graded road. This area contains approximately twenty-six hundred and fifty acres of land. The topography is very flat with occasional small intermittent streams and drainage ditches. Along these streams and ditches brush and hardwood trees provide good cover and a considerable amount of the quail food. Turnrows and field roads provide good cover and food, also. Native legumes, as well as legumes planted for soil improving practices and farm use are abundant. Small grain crops, such as oats and others, and cover crops, furnishes still another source of food for the quail. Some berry producing shrubs are located on this area.

The control area similar in all respects is located Southwest of Oak Ridge and approximately fifteen miles from Collinston.

These project areas henceforth will be designated respectively as—The experimental area as F-1 and the control area as F-2.

Maps were obtained from the Soil Conservation Service.

A census of the experimental area was made in the fall before releases were made and again in March. The census was obtained with the aid of bird dogs and listening to the morning and afternoon periods of whistling. The control area was censused before and after the close of quail hunting season, December 1 through February 20.

The areas were subject to normal hunting, and work was carried on as secretly as possible.

Releases of pen raised quail:

Date of Release	No. Liberated	Age	Conditions When Released
Nov. 17, 1944	240	12-14 weeks	Cold and wet; medium population of wild birds; drizzling rain in late afternoon of release day; food and cover good; pen raised quail in good condition. Damp weather continued through first week of release.
April 27, 1945	78	Adult	Cool and damp; medium quail population; food and cover fair; pen raised quail in good condition; hard rains day after release; and again four days after release.

The birds for fall and spring release on project F-1 were prepared at the hatchery in the same manner as birds for release on project D-1 and E-1.

Immediately following release, liberated quail were observed over a period of a week.

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OBSERVATION OF QUAIL ON PROJECT AREA

Fall Release:

The first period of observation, immediately following release, was from November 17, 1944 through November 22, 1944. The liberated quail whistled very freely throughout the period, answering this Biologist's whistles at all times. Liberated quail were very tame and flew only after every known way to frighten them was tried. Their flight was very erratic and after an average flight of approximately fifteen yards was made, would settle to the ground and begin to whistle. Little covey instinct was shown by the quail during feeding periods or while roosting.

Data on F-1 area—Nov. 17 through Nov. 22, 1944:

Covey No.	No. Birds Per Covey	Dec. at End of Obser. Period	Cause of Dec.	Approx. Distance of Movement from Release Point at End of Period. See map F-1
I	20	0		0
II	20	0		1/4
III	20	0		1/16
IV	20	0		1/4
V	20	0		3/16
VI	20	0		1/16
VII	20	0		1/32
VIII	20	0		1/4
IX	20	0		0
X	20	0		1/32
XI	20	0		0
XII	20	0		1/8

All coveys were intact and apparently in good condition at the end of observation period.

The second visit was made to the area during the first half of December. Six days were spent on project area. Quail were located by listening to the morning and afternoon periods of whistling and with the aid of two bird dogs. Ten coveys of quail were found during the observation period. It is thought that all of these coveys contained pen raised and wild quail due to their difference in flight. However, efforts to confirm this belief were fruitless as trapping was not successful and no leg bands were seen on any of the quail.

Data on F-1—December 11 through December 16, 1944:

Covey No.	Est. No. Birds Per Covey	Dec. from End of Last Obser. Period to End of Present Period	Cause of Decrease	Approx. Distance of Movement from Last Obser. Period to End of Present Period in Miles. See map F-1
I	18	2	Unknown	1/4
II	17	3	Unknown	3/16
III	14	6	Unknown	3/16
IV	15	5	Unknown	1/8
V	18	2	Unknown	1/4
VI	13	7	Unknown	1/32
VII	14	6	Unknown	1/4
VIII	17	3	Unknown	3/16
IX	19	1	Unknown	1/16
X	20	0		3/8
XI	Not Located			
XII	Not Located			

Evidence on cause of decrease was not available, but it is believed that hunters accounted at least part of the decrease. No hunters were checked on project area during this period.

The next visit to this area was made during the first part of January 1945. Eight days were spent on project area observing and attempting to trap quail. Ten coveys of quail were located with dogs and by listening to the morning and afternoon whistling periods. Trapping was attempted without success and no leg bands were seen on any of the birds.

This area was heavily hunted during January by sportsmen, but no banded birds were taken. It was assumed that all missing from coveys were taken by hunters.

Data on F-1—January 1 through January 9, 1945:

Covey No.	Est. No. Birds Per Covey	Dec. from Last Obser. Period to End of Present Period	Cause of Dec.	Approx. Distance Traveled from Last Obser. Period to End of Present Period in Miles. See map F-1
I	14	4	Hunters	1/8
II	12	5	Hunters	0
III	9	5	Hunters	0
IV	13	2	Hunters	1/4
V	12	6	Hunters	1/2
VI	6	7	Hunters	3/8
VII	9	5	Hunters	1/4
VIII	11	6	Hunters	1/8
IX	15	4	Hunters	1/4
X	12	8	Hunters	1/4
XI	Not Located			
XII	Not Located			

The next visit to the area was in February 1945. A total of six days were spent on project area. Nine coveys of quail were located with the aid of bird dogs on project area. Trapping was again attempted with no results and leg bands were not seen on any quail. Difference in flight of covey individuals was not evident.

Data on F-1 area—February 5 through February 10, 1945:

Covey No.	Est. No. Birds Per Covey	Dec. from Last Obser. Period to End of Present Period	Cause of Dec.	Approx. Distance Traveled from Last Obser. Period to End of Present Period in Miles. See map F-1
I	8	6	Hunters	1/16
II	Not Located			
III	6	3	Hunters	3/8
IV	9	4	Hunters	1/8
V	7	5	Hunters	3/8
VI	6	0	Hunters	1/8
VII	9	0		3/16
VIII	10	1	Hunters	0
IX	9	6	Hunters	1/16
X	11	1	Hunters	0
XI	Not Located			
XII	Not Located			

Hunting activity was heavy on this area during this period. Hunters were checked, but no banded birds were taken by sportsmen. The cause of decrease was assumed to be heavy hunting.

The next trip to this area was made during the first of March 1945. Six days were spent on project area observing, and attempting to trap quail. Trapping was unsuccessful and no leg bands on quail were seen. No notice-able difference in flight was seen that might lead one to think that pen raised quail were present. Nine coveys were located on the project area.

Data on F-1 area—March 5 through March 10, 1945:

Covey No.	Est. No. Birds Per Covey	Dec. from Last Obser. Period to End of Present Period	Cause of Decrease	Approx. Distance Traveled from Last Obser. Period to End of Present Period in Miles. See map F-1
I	8	0		0
II	Not Located			
III	6	0		0
IV	9	0		0
V	7	0		1/16
VI	6	0		0
VII	9	0		0
VIII	10	0		0
IX	9	0		0
X	11	0		0
XI	Not Located			
XII	Not Located			

The first six days of April, April 2 through April 7, 1945, were spent on area attempting to trap quail, but was not successful. The same covey ranges were used as were used during March but the pairing off of quail had started; no coveys were seen. Dogs were not used in location work at all during this trip.

SPRING RELEASE:

Observations of the spring release quail were made the day of release and part of the next day. Rain and reports kept the Biologist out of the field for the next two days—following that observations continued for six days uninterrupted. The actions of the liberated quail were much the same as on project D-1 and E-1.

Data on F-1—April 27, 28, and May 1 through May 5, 1945:

Covey No.	No. Birds Per Covey	Dec. Cause	Approx. Distance from Release Point in Miles. See map F-1
1	6	0	1/8
2	6	4 Unknown	0
3	6	1 Fox	1/4
4	6	0	3/16
5	6	5 Unknown	0
6	6	4 Unknown	0
7	6	3 Unknown	0
8	6	0	1/16
9	6	0	1/4
10	6	0	3/8
11	6	0	1/8
12	6	0	3/16
13	6	0	1/16

For other information on mortality see band collection data.

During the second and third trips, May 21 through May 26 and June 13 through June 20, 1945 respectively, no coveys were found—but numerous pairs were observed. No leg bands were seen, but judging from their flight pen raised quail were present.

TRAPPING

Trapping attempts were begun on this project area in December 1944, using the same type traps and methods as stated in TRAPPING on project D-1 and E-1. However, different bait was used on this project area. Whole grain corn and soybeans were used separately and in mixtures.

Trapping attempts were made once a month from December through April without obtaining any results.

BAND COLLECTION

No bands were obtained from fall release quail, but seventeen bands were found near release points of the spring release with the following information:
Data on band collection from project F-1:

Covey No.	Band No.	Approx. No. Days Lived	Wt. When Released in Ozs.	Approx. Distance from Release Point in Miles	Cause of Death
3	13245	4	5 49/64	1/4	Fox
5	13213	6	5 47/64	0	Unknown-predator
	13214	6	5 46/64	0	" "
	13215	6	5 49/64	0	" "
	13241	6	5 49/64	0	" "
	13242	6	5 48/64	0	" "
6	13216	6	5 40/64	0	" "
	13217	6	5 47/64	0	" "
	13218	6	5 43/64	0	" "
	13247	6	5 51/64	0	" "
7	13220	6	5 47/64	0	" "
	13255	6	5 49/64	0	" "
	13257	6	5 51/64	0	" "
2	13205	6	5 48/64	0	" "
	13252	6	5 49/64	0	" "
	13253	6	5 47/64	0	" "
	13254	6	5 47/64	0	" "

Cause of death of the quail was not definitely established and was listed in the manner above because the carcasses found looked as if a fox or housecat had caught them. No tracks or other evidence was available due to heavy spring rains between visits to the project area. However, this area carries a high population of both.

CENSUS FINDINGS:

Proj. Area	Preliminary Census	Spring Census	Acres Per Quail	
			Fall	Spring
F-1	72	64	36.8	41.4
F-2	71	49	36.6	53.1

Of the sixty-four quail located on project F-1 no banded birds are known to exist.

RECOMMENDATIONS:

A few suggestions that should be considered for future investigations of this type, listed in the order of their importance are as follows:

1. Some method of marking the birds to be liberated so that they may be recognized in flight, should they be found.
2. Improved trapping technique should be developed. Possibly the use of more traps to the trapping site.
3. Use of scales that would not be so sensitive to weather conditions (namely—wind) and not as cumbersome to carry as the present ones.
4. Possible standardization of field notes, work plans, and job sheets.

This investigation is being carried on as a program of cooperation between the State and Federal Governments for wildlife restoration. The purpose is to determine the behavior and survival of pen raised quail on the types of terrain representative of the various sections of Louisiana.

CONCLUSIONS:

Sufficient data could not be collected to draw any final conclusions; however, a few statements may be made at this time.

From findings on experimental areas it may be concluded that:

1. Until better technique is developed trapping is a poor method of censusing quail in fall and winter.
2. The behavior of pen raised quail when first released is very erratic. Assimilation of the aspects of native quail begins within two to three weeks in the field.

3. It may be assumed that the weather conditions at the time of release and shortly thereafter and the condition of the released quail have a definite relation to the per cent of survival of pen raised quail.

Respectfully submitted by:
ROWLAND P. VERNON,
Field Biologist.

Approved by: JOHN S. CAMPBELL,
Project Leader.
Date: July 10, 1945.

STATE: Louisiana
PROJECT NUMBER: 2-R
DATE: April 9, 1945

SUMMARY PROGRESS REPORT
QUAIL RELEASE INVESTIGATIONS
As Required By
FEDERAL AID IN WILDLIFE RESTORATION ACT

Supervisors: Major John G. Appel, Commissioner, Department of Wild Life & Fisheries
Major James Brown, Director, Fish and Game Division
Leader: John S. Campbell.

Summary Report of Progress, Southwest District:

Field Biologist: Carroll J. Perkins, Elizabeth, Louisiana.
Project Areas in Acadia and Vernon Parishes.

This is a summary progress report on work done by Carroll J. Perkins dating from the beginning of this investigation, July 1, 1944 to March 1, 1945, at which time he was called for military service. This investigation will be resumed on the date of his return and will be continued until completed.

SUMMARY REPORT OF PROGRESS

This is a summary report of the field investigation carried on from July, 1944 to March 1945, in Southwest

Louisiana. Work was carried on under the auspices of Federal Aid to the State Wildlife Investigation and Restoration Program.

One objective of this work was to determine the behavior and survival of released pen-raised quail in three different types of environment. These three are representative of a large portion of the land suitable for quail propagation in Southwest Louisiana. To do this, it was decided to establish study areas in each type of environment. These study areas were to be approximately 1500 to 2500 acres in size. On each area 12 coveys of pen-raised quail, each containing 20 banded birds (10 male and 10 female) 12 to 14 weeks old, were to be liberated. The behavior and survival of these birds were to be studied by trapping, making field observations, and checking the band returns. This investigator was equipped with an automobile, trailer, saddle horse, dogs, quail traps, binoculars, camera, and balance scales to further the investigation.

One type of terrain is in the rice belt of lower Southwest Louisiana. This area is subject to intermittent floods which destroy the entire quail population. Some previous success has been had in releasing quail in this type area.

Another type of habitat investigated was in the cutover longleaf pine lands from which the timber had been removed 20 to 25 years ago. According to reports this section has been decreasing in quail population for the last decade.

The third type investigated was the cutover longleaf pine lands cut from three to five years ago. This area was thought to furnish excellent quail food and cover, and yet it was not fully stocked with quail.

One objective of this program was to inaugurate a work plan method of field investigation. With this in mind, a job sheet was drawn up by the Regional Inspector, Mr. Clarence W. Watson, and the Project Leader, Mr. John S. Campbell, and this investigator.

Another objective was to develop field technique in methods of trapping, enumerating, and making field observations of quail.

As previously stated it was desired to set up an area of investigation in the rice belt of Southwest Louisiana. The preliminary work of locating the area was begun in August, 1944. It was thought advisable to contact representatives of the local sporting clubs in this section. On August 21, Mr. Bill Cleveland and Mr. Dorsay Peckham of the Crowley Sporting Clubs were contacted. The work to be done was outlined to them and the importance of no publicity was stressed. With their help, several likely looking areas were examined. On August 23, a suitable tract near Egan, Louisiana, was selected for the project.

This tract lies along Bayous des Cannes, approximately three miles west of Egan, Louisiana. It is bounded on the south by an irrigation canal, on the west by Bayou des Cannes, on the north by the highway to Evangeline, Louisiana, and on the east by an imaginary line three-fourths of a mile out in the rice fields running parallel with Bayou des Cannes. This area is nearly two miles long and one and one-half miles wide, and contains about 2240 acres. Bayou des Cannes is a slow running bayou bordered by a tupelo-gum, cypress swamp. At the edge of the swamp the land rises abruptly five to seven feet to the level of the adjoining rice fields. Between the swamp and the rice fields is an area of scattered post-oak and loblolly pine. This strip is covered with a thick growth of carpet grass and common lespedeza. There are a few patches of pure loblolly pine. According to local residents, this area suffered a severe flood in 1937. Prior to this time there was a relative abundance of quail. Since then no quail have been seen.

On August 28, a trip was made to this area to complete the work preliminary to setting up a project and a control area. A tract suitable for the control area was located three-fourths of a mile north of the northern boundary of the proposed project. It is similar in all respects to the project area.

Henceforth, this project area will be designated as A-1 and the control area as A-2.

A type map was made from aerial photographs of this section from the AAA office in Crowley, Louisiana.

The next four days were spent in making a quail census on the project and control areas. Both places were worked north and south, then east and west with dogs. Attempts were made to hear the morning and evening calls of quail. No quail were found; no calls were heard. Release points were selected. Predatories did not seem to be abundant at this time. Two fox tracks were seen and evidence of owls was noted.

On September 28, 240 pen-raised quail (12 to 14 weeks old) were weighed, banded, and their tail feathers daubed with white paint at the state-owned quail hatchery in Natchitoches, Louisiana. They were boxed, 20 birds to each box (10 male and 10 female), and transported to Crowley, Louisiana via automobile. The following morning these birds were released at previously selected release points, one box to each point. The releases were made by cutting a small hole in the end of the cardboard box, placing the box on the ground, and letting the quail walk into cover. This proved very satisfactory as only one bunch flushed after they had left the box. These birds flew very erratically—most of them alighting in trees. They began to whistle immediately. The day was warm and the sun was shining brightly, and most of the birds began to feed immediately upon release. They seemed to have no food preference, eating any food conveniently located. The releases were completed by 11:00 A. M.

The next four days were spent in observing the behavior of the released birds. In general they were badly scattered. Several single quail flushed. Some quail would answer practically every time the investigator whistled. The weather remained warm with no rain. Bird dogs were not used at this time because it was thought best not to disturb the quail any more than necessary.

The next visit to this vicinity was in the middle of November. The first day a check was made on control area, A-2, to complete the census. No quail were located. The next day or two were spent in covering the project area, A-1, with dogs. Only two coveys of quail were located during these two days. One containing about 35 birds was found near release point No. 2 (see Map A-1a).

The birds flew normally and went to a thicket about 200 yards distant. They would not aswer the investigator's whistle one hour later. The other covey was found on the north end of the project near release point No. 8 (see Map A-1a). These birds also flew normally to a thicket 100 yards distant. Evidence of either a hawk or an owl having eaten a quail was found. No band was located. There seems to be a concentration of hawks in this area at present.

The next visit to this section was made in the middle of January. Seven days were spent on the project. Each morning the investigator listened for the morning calls of quail. However, the weather remained cloudy and windy and no calls were heard. The first day the south end of the project was covered with dogs. Several places were baited with corn to attempt to trap the quail. Two quails were found on the area covered. One covey of approximately 18 birds was located near release point No. 5. These birds were on a small burnt area and were seen running ahead of the dogs. The quail flushed normally. The next morning the north end of the project was worked with dogs. Likely looking spots were baited with corn. Two coveys were located in this area. One was discovered near release point No. 8. It contained 10 birds. The other, near release point No. 9 contained 12 birds. Several birds in the latter covey alighted in trees; and with the use of binoculars, it was determined that they were banded. Traps were placed at the baited places along the south end of the project. The traps were propped up in the hope that the quail would become accustomed to them. The following morning the traps were rebaited and set on the southern end of the project. Three traps were near each known covey. That afternoon six traps were set on the northern end of the project, also three traps to the covey. The succeeding day, in the late morning the traps were rechecked. Six quail were caught in a trap near release point No. 2. These birds were weighed, band numbers recorded, and released. It was found on checking with the records that these birds represent four different release points, and the furtherest being approximately one mile distant. The balance of the covey flushed from near the trap. Two birds escaped capture while the investigator was attempting to remove them from the trap. The trapped birds had gained in weight from three-fourths to one ounce each. No other traps contained quail. In the late morning of the following day the traps were again run. No quail were caught. The covey was again flushed on the northwest corner of the project near release point No. 9. These birds again alighted in trees and three were seen to be banded. The traps were checked the next day and picked up. No quail were caught.

On February 2, 1945, notice was received of one band being collected by a hunter. This bird was apparently taken from the covey near release point No. 2. It was one-fourth mile from where it had been released.

During the first part of March, a census was taken, using dogs, on project area A-1 and Control area A-2. Project area A-1 was found to have four coveys with a total of 62 birds. This averages one quail to 36 acres. Area A-2 was also censused. No birds were found.

The preliminary work of setting up a study area in the pine lands cutover 20 to 25 years ago was begun the first of October. Several acres were examined before a suitable one was found. An area was selected, and preparatory work begun. This project is located on rolling longleaf pine lands that were cutover about 25 years ago. It is in Vernon Parish approximately seven miles northwest of Cravens, Louisiana. It is bounded on the north by the old Cravens highway, on the west by the creek known as Big Branch, on the east by a graded dirt road, and on the south by an imaginary line drawn from Big Branch to the dirt road. This area is about two and one-half miles long and one and three-fourths miles wide and contains around 2,510 acres. This section is well known to the investigator and at one time afforded excellent quail hunting. However, in recent years the hunting has been poor. Mapping, censusing, and selecting release points was done between October 9 and October 20. It was found that this area provides excellent cover conditions. However, available food is not plentiful. It also supports the highest fox population ever seen by the investigator. It is thought that the retarding factor of quail propagation will be predators and lack of food.

The census was made with the use of bird dogs and revealed five coveys containing a total of 65 birds on the area. This averages one bird to 39 acres. Several foxes were observed while making the census.

Henceforth, the project area will be designated as B-1 and the control area as B-2.

The control area was located approximately one mile west of the project. It was also censused at this time. It contains 2,200 acres and was found to have four coveys with a total of 54 quail. This is an average of one bird to 41 acres. Maps of the study and control areas were made at this time from S. C. S. aerial photographs obtained in DeRidder.

On October 21, 240 pen-raised quail (12 to 14 weeks old) were banded and weighed at the State-owned hatchery at Natchitoches. These birds were placed in boxes of 20 each (10 male and 10 female) and carried to the project area B-1. Three boxes were released before dark. The weather was fair and warm. No birds flushed when released. The releases were begun early the next morning and completed before 10:00 A. M. The weather continued warm and clear and the released birds were in good condition. Only two boxes of birds flushed when liberated. They flew very erratically and many alighted in trees. Some of them began whistling as soon as they alighted. The next seven days were spent on the project observing the behavior of the released birds.

The first day one dog was used in locating the birds. One covey, apparently native birds, was found in the exact location of release point No. 8 (see Map B-1a). Five quail were found about 100 yards southeast of release point No. 7. These birds were banded and walked boldly six feet in front of the dog. Twenty quail were flushed near release point No. 10. One bird found near release point No. 6, and a large covey near release point No. 9, were apparently banded, but flew very much like native birds. Near release point No. 8 several quail were heard whistling. One bird was running crazily through the grass.

The next day, October 21, was spent on horseback riding through the area without any dogs. Three birds were heard whistling but no birds were seen.

On October 25, eight birds were seen feeding near release point No. 7. They were in short grass and were indifferent to this investigator's approach on horseback. However, when approached on foot, they flushed and flew in a semi-circle about 30 yards wide. The leg bands seemed to bother them some when walking or running through the grass.

On October 26, the dogs were used. The remains of a quail were found east of release point No. 1. This was apparently eaten by a fox. A search in the grass revealed the leg band. Six birds were found about 300 yards east of where the bird remains were found. Six more birds were located near release point No. 7. When flushed, they flew like native birds. Covey No. 5 and covey No. 9 contained all twenty birds. A native covey was found near release point No. 4 which contained approximately 12 birds.

On October 28, dogs were again used to check on quail. A covey of approximately 15 quail was located about one-half mile east of release point No. 12. These flew like native birds. The dogs flushed a covey near release point No. 1. The birds were not seen. Sixteen quail were found between release points 6 and 7. The birds flew to a thicket. A covey of 14 native birds was found northwest of release point No. 10. The dogs trailed a covey near release point No. 4; no birds were seen.

Evidence of the presence of many foxes was found during the week.

On November 20, a trip was made to area B-1. Six coveys were located and it was impossible to determine whether they were released or native birds.

A trip was made to project area B-1 on December 12. Five days were spent in attempting to trap quail. On many instances the bait was eaten and the traps were overturned by hogs. No quail were caught. Dogs were used to locate the birds. Seven coveys were located the first day: One near release point No. 8 containing approximately 20 birds; one near release point No. 7 containing 8 or 9 birds; another east of release point No. 1, flushed ahead of the dogs (the number was unknown); one near release point No. 4 had 16 birds as did a covey near release point No. 6. All birds seemed to fly normally. Late in the afternoon a hawk, presumably a blue darter, was seen to drop a half-eaten banded quail from a tree.

Another trip was made to B-1 on December 26. It rained and was very cold all day. Two coveys were located in the morning. One was near release point No. 8, and one other near release point No. 9. The birds released at release point No. 9 have stayed in that vacinity and have been located at each try. Sets were baited all over the project in preparation to setting the traps. The next day was also cold and rainy. The traps were carried to the sets and propped up with bait underneath. Some of the sets had been visited by quail. Hogs had eaten several baits. The following day all traps were set. The area was worked with dogs, and three coveys were located near release points 11, 9, and 1. The birds near release point No. 11 were observed with field glasses. Twelve birds were counted and all were banded. The weather on the following day was cold and rainy. No quail were caught in the traps. The next day netted the same trapping results. The traps were left unset. Remains of a banded bird having been eaten by a fox were found. The band was located in the tall grass.

The next visit to area B-1 was on January 2, 1945. All sets were rebaited at this time. One covey of approximately 18 birds was observed in a fire lane near release point No. 5. At least one-half of these birds were not banded. A fox was also jumped near release point No. 4. On the succeeding day there was a cold drizzling rain. None of the baits had been bothered. All traps were set. A covey was seen near release point No. 12 containing approximately 12 birds which, when flushed, flew to a thicket. Later in the afternoon three unbanded and four banded birds apparently of the same covey were observed in the thicket. The next day no quail were trapped. Hunters were heard on the northern part of the project. They were not contacted. The following day the traps were picked up. No quail were caught. Dogs were used to locate a covey near release point No. 8. This covey (approximately 18 to 20 birds) undoubtedly consisted of banded and unbanded birds as a native covey that previously used this range has not recently been observed. Field glasses were used to observe ten banded birds running down a fire lane near release point No. 9. Evidence of a fox having eaten a bird near release point No. 8 was found. The leg band was located.

A trip was made to project B-1 on January 11, when traps were set all over the project. Dogs were used to locate four coveys. The covey found near release point No. 6 contained approximately 14 birds; the other near release point No. 10 had 16 birds; release point No. 1 had 14; release point No. 4 had 12 birds; actual count. It was impossible to determine which were released birds and which were native as they all flew normally.

The following day eight birds were trapped near release point No. 9; all were banded. These birds were weighed and band numbers recorded before being released. They had gained an average of three-fourths of an ounce. This apparently was not all of the birds in the coveys as others were whistling nearby. No other birds were caught.

The next day several song birds and two rats were caught, but no quail. The traps were left unset.

On January 15, all traps were reset. Hunters were heard near the project but they were not contacted. Dogs were not used; and no birds were located. The following morning 12 birds were caught near release point No. 12. Five birds were banded and had been formerly released at release point No. 12. The other seven were native birds. All quail were weighed and found to be in excellent condition. The banded birds had gained an average of five-eighths of an ounce in weight. Their weight compared favorably with the native birds. A fox was seen in the afternoon near release point No. 7.

On the following day no birds were caught; however, nine birds were observed near release point No. 6 for quite a while. Some were banded; others were native. Two hunters were contacted on the area; and in the conversation, it was discovered that they had killed ten quail. They were surprised to find that they had five banded birds in their bag. These birds were weighed and the band numbers recorded. These weights showed an increase of three-fourths of an ounce to one ounce since release.

On January 18, no quail had been trapped. The traps were picked up.

The next trip was made to project B-1 on February 9. The weather was cold and disagreeable. Sets were baited throughout the project. Two small coveys were located: One near release point No. 7 had 12 birds the other near release point No. 9 had 7 birds. The following day traps were carried to the baited places and set. There was no evidence of quail having visited the baits. Dogs were used to locate a covey near release point No. 2. These birds were observed approximately one hour with field glasses. There were nine birds in the covey, approximately 5 with and 4 without bands. The same day nine birds were located on a burnt area near release point No. 12. Apparently three were banded.

On February 13, the traps were set again on the project area. Work was done on the census of the control area.

No birds were trapped the succeeding day. Work on the census of the control area was completed (see Map B-2a). Three coveys were located with a total of 22 birds. This gives the control area an average of approximately one bird to 100 acres.

On February 15, nine quail were trapped between release points No. 1 and No. 2. Three of these birds were banded. These had gained from one-eighth to five-eighths of an ounce each. The following day no birds were trapped.

Work has begun on the census (with dogs) of area B-1 on February 17. No quail were trapped and the traps were picked up. The work on the census was completed (see Map B-1b). On this day, four bands were returned to this investigator. These birds were taken by hunters in the northern part of the project near release points No. 4 and No. 5. The census revealed nine coveys with a total number of 66 quail on the area. This gives an average of one bird to 38 acres.

The third type of environment upon which it was desirous to set up a study area was in the longleaf pine lands that were cutover from 1940 to 1942. The first part of November was spent in the selection of such an area. A suitable tract was located on November 17, and preliminary work was begun. This study area is situated approximately three miles north of Simpson, Louisiana, on land cutover in 1941. It is approximately one and three-fourths miles wide and two and one-fourth miles long, and comprises an area of approximately 2,520 acres. This area is rectangular in shape with no natural boundaries. (See map C-1a). This is an area with steeply rolling hills and many narrow ravines, affording excellent cover conditions. Many types of legumes are represented in abundance.

Work on the census and selection of release points was begun November 21. Maps were made from the aerial photographs from the S. C. S. offices in DeRidder, Louisiana. The census was completed November 23. (See map C-1a). This census revealed 11 coveys with a total of 146 quail. This averages one quail to 17 acres.

The preliminary work revealed no large numbers of any type predators. Hunters will probably be the retarding factor in the increase of quail in such an area.

Control area C-2 was selected and census work begun on November 23.

On November 28, a trip was made to the State owned quail hatchery in Baton Rouge, Louisiana, to obtain the pen-raised quail for release on this project. Through a misunderstanding the attendant banded and boxed the 240 birds (12 to 14 weeks old) the preceding day. A considerable amount of lettuce was placed in each box for the quail. These birds were transported to Elizabeth where they were weighed and the band numbers recorded on the night of November 28.

The next morning they were carried to project area C-1 and released at the previously selected release points. The birds were in a poor condition when released. However, they began to feed on anything available as soon as they were out of the box. Two bunches flushed upon release with a very erratic flight and began to whistle as soon as they alighted. The weather in the afternoon was cold and raining. The following day was spent in the field (without dogs), observing the released quail. One covey of 18 birds was seen near release point No. 1. They appeared to be in poor condition. The next trip to this area was on December 4. The weather on the three preceding days had been very severe. On this day the area was thoroughly covered on horseback without dogs. One covey of 18 birds, apparently native, was found near release point No. 9. Three fresh quail roosts were found near release points No. 3, No. 5, and No. 7. Some fox tracks were seen but they were not plentiful. One horned owl was seen. The following day a census was completed on the control area C-2 (see Map C-2a). The control area is located approximately one mile west of the project area and comprises an area of approximately 2700 acres. The census revealed 13 coveys with a total of 160 quail, and an average of one bird to 17 acres. Four coveys of quail were located on the project area. Dogs were used. Apparently all were native birds.

The next visit to area C-1 was on December 18. Dogs were used to locate four coveys. From their actions it was decided that all were native quail. Apparently this area has supported much hunting, as the number of birds in each covey greatly decreased.

The following day the area was again covered with dogs. Remnants of five coveys were located. Apparently none were banded. The next day the project and control areas were worked with dogs. It is estimated that the quail population in this vicinity is about one-fourth of what it was before release. Some hunting was done on the project area in the late afternoon. This investigator was not able to contact the hunters. The remains of one quail, evidently eaten by an owl was found; no band was located.

On January 29, the traps were carried to the project area and set. Several other places were baited. The project area was checked with dogs; and three small coveys were located near release points No. 3, No. 5, and No. 7. These appeared to be native quail.

The following day the traps were checked in the late afternoon. No quail were caught. Hogs had eaten the bait at several sets. Dogs were not used and no quail were seen. The next day the traps were again visited in the late morning. No quail were caught. Most of the area was checked with dogs. The remnants of four coveys were found: Near release point No. 3, 3 birds; near release point No. 1, 5 birds; near release point No. 5, 3 birds; and near release point No. 12, 6 birds. All appeared to be native birds. One single bird was seen. It was flushed near release point No. 9. Traps were run the following morning, and no quail were caught. Dogs were not used, and no quail were seen. It was reported by one of the local inhabitants that there had been quite a bit of hunting the previous afternoon. No traps were bothered. The traps were run late the following morning. Five native quail were caught near the release point the following morning. One of these quail had a crippled leg and had apparently been shot. The other four were in good condition. The next day no birds were caught; the dogs were not used; no birds were seen. The traps were left unset.

February 5 was very cold and disagreeable. The traps were all rebaited and set. Not much field work was done due to the intense cold. The following day one song bird and one rat were caught; but no quail. A talk with one of the local sportsmen revealed that he and one other hunter had done practically all the hunting in the vicinity of the project area. They had killed many birds in that section but had not seen a banded bird and were genuinely surprised to hear that quail had been released in the vicinity. The following day no quail were seen. The traps were picked up.

The next trip was made to this area on February 19, when work on the census with dogs was started. During the following two days the census was completed (see

Map C-1b). The census revealed that there were eight coveys with a total of 37 quail on the project area. This gave an average of one quail to 68 acres.

Evidence of something having eaten a bird was found; but no band was located. On the following day, February 22, a census of the control area, C-2, was completed (see Map C-2b). This census revealed eight coveys with a total of 50 quail, which averages one quail to each 54 acres.

CENSUS FINDINGS

Proj. and Cont. Areas	Preliminary Census (Quail per acre)	Census After Release (Quail per acre)	Spring Census (Quail per acre)
A-1	0 to 2,240	1 to 9	1 to 36
A-2	0 to 2,240	....	0 to 2,240
B-1	1 to 39	1 to 7	1 to 38
B-2	1 to 41	....	1 to 100
C-1	1 to 17	1 to 7	1 to 68
C-2	1 to 17	....	1 to 54

It is easily understood that insufficient data has been collected to draw up any final conclusions. However, a few preliminary statements may be made.

From the findings on the study areas, it may be concluded that:

1. The release of pen-raised quail in the fall is an unsatisfactory method of establishing quail population. Nevertheless, until more investigation is carried on, it is one way of establishing seed stock on suitable areas that have no quail.
2. Until better methods are developed, trapping is, in general, a very poor method of censusing quail in the fall and winter.
3. It may be assumed that the condition of the quail when released and the weather conditions shortly thereafter have a definite relation to the per cent of survival of pen-raised quail.
4. The behavior of quail when first released is very erratic, but within a week or ten days in the field, the birds begin to assimilate the aspects of native quail. However, it seems to take thirty or forty days to become fully acclimated.

A few suggestions that may be considered for future investigations of this type are as follows.

1. Improved trapping technique should be developed.
2. Some sort of collapsible, easily handled trap should be devised. Present ones are too cumbersome to carry.
3. Some method of marking the birds so that they may be recognized in flight should be found. A suggestion: Dip the tail feathers in some bleaching agent such as hydrogen peroxide and bleaching them white.
4. In the future, work plans and job sheets should be made covering each day of activity. For best results the investigator should follow the job sheet as closely as possible.

The investigation was carried on as a program of cooperation between the State and Federal governments for wildlife restoration. The purpose of this investigation was to determine the behavior and survival of pen-raised quail on three types of terrain. Study areas and control areas were set up in three representative types of enviroment, namely, the rice belt, the longleaf pine lands cutover 25 to 30 years ago, and the longleaf pine lands cutover 2 to 5 years ago.

Another purpose was to inaugurate a work plan and job sheet method of carrying out quail investigation in general.

Still another purpose was to develop field technique in trapping, censusing, and field investigating in general.

Work on the study areas proceeded in the following manner:

1. Areas were censused, mapped, and favorable release points selected. Control areas of field conditions similar to that of the project area were also located, mapped, and censused.
2. On each project, 240 pen-raised quail, (12 to 14 weeks old) were banded, weighed, and released.
3. The survival and behavior of these quail were determined by trapping and field observation.

4. The study and control areas were again censused in the spring and revealed that the release of pen-raised quail added very little to the average quail population five months after release.

Respectfully submitted,

CARROLL J. PERKINS,
Field Biologist.

Approved: Major James Brown
Date: April 16, 1945

Note: Except No. 4 above, that statement is only true of Project Area "C". According to Perkin's detailed report the quail released on Area "C" were in very poor condition due to being held too long in containers and then a period of extremely bad weather undoubtedly killed all of these quail. Project Areas "A" and "B" had banded pen-raised quail on last inspections by Perkins.

Signed: MAJOR JAMES BROWN.

Project LA. 1-R is the study of Marsh Management. This project has been completed and a final report is being prepared. When the final report is ready, it will be printed and distributed.

MIGRATORY WATERFOWL REPORT 1941-1945

Season	Clubs Reporting	No. Guns	Ducks and Geese Killed	Duck Stamps Sold in La.	Hunting Lic. Sold in La.	Average Kill Per Gun
1941-42	30	6,398	48,904	45,102	146,648	7.64
1942-43	23	6,063	50,165	44,252	131,009	8.27
1943-44	25	6,992	59,075	35,199	94,609	8.45
1944-45	26	7,867	82,544	44,893	124,485	10.17

ESTIMATED GUNS AND KILL ON DUCKS AND GEESE FOR ENTIRE STATE

1941-42	Probable guns entire State	225,510
1942-43	Probable guns entire State	221,260
1943-44	Probable guns entire State	175,995
1944-45	Probable guns entire State	224,465
1941-42	Probable State kill	1,046,366
1942-43	Probable State kill	1,166,040
1943-44	Probable State kill	959,193
1944-45	Probable State kill	1,609,414

From a low of an estimated 30,000,000 ducks in 1934, there has been a steady increase each year to an estimated

150,000,000 ducks in 1944. Despite this steady increase many duck hunters in Louisiana contend that there has been no increase here. The first set of figures are the actual reports from our licensed hunting clubs and show that our hunting has improved each year. In the second table I have conservatively estimated the number of duck hunts made and the total State kill. With less hunters in 1942 than in 1941, the total kill was larger and the average per gun was higher. In 1943 with a large decrease in hunters the State kill declined but the average kill per gun increased and in 1944 the number of hunters increased and the average kill per gun also increased. This was due to the increased limit on Mallards, Pintail and Widgeon, which increased from a daily bag limit of ten to fifteen. Mallards have provided the greatest kill.

The actual figures from the reports of the licensed clubs show that Mallards made up nearly fifty per cent of the total kill. Pintails were next with about fifteen per cent. Gadwalls, Ringneck and Green-winged Teal with about six per cent each. Blue-winged Teal and Spoonbill with about four per cent and Widgeon two and one-half per cent. The reported kill also included in lesser numbers the following species: Dos-gris (Lesser Scaup), Poule d'Eau (Coot), Canvasback, Bufflehead and Redhead. Blue and Snow Geese, Canada and White-fronted Geese.

Although generally the flights of our Migratory Waterfowl follow a well defined course, weather conditions along the flyways and local conditions in our concentration areas change our duck populations each year. Last season, a very late winter in the Northern Zone held most of our ducks in the breeding grounds and the corn belt of our Northern and Central States well into December. When they finally started South, extreme cold weather from the Mississippi Valley East shunted the main flight west into Southeast Texas and Mexico. This great flight did not enter Louisiana till January on their return flight. The last few days of the season and well into February, this flight came along our Coast and went up the Atchafalaya and Tensas rivers into the Northeast corner of the State. The early flights of Pintail, Blue-winged Teal and Mallards that start in Sep-

Weighing and Counting Fish for Distribution.

tember found a great part of their areas in Louisiana dried up and were forced to move into areas that had plenty of water. This condition put large concentrations in the large waters of our Southeastern Parishes where they rested during the day and fed in the surrounding areas each night. Particularly large concentrations were present all season in Lake Borgne and Lake Pontchartrain. Rains finally relieved the drought conditions in Cameron and Vermilion Parishes in mid-December but the large flights went West and only scattering flights came into our duck marshes of Vermilion and Cameron. The hunting clubs records show that in spite of a much smaller concentration in their areas, they shot more guns and killed more ducks than they had since the early thirties. There is no question in my mind that many clubs overshot their properties. The most heavily shot club increased their guns from 774 in 1943-44 to 1,076 in 1944-45 and their kill from 7,717 to 12,905. Another club .increased their guns from 1941-42 of 453 with a kill of 4,039 to 903 guns in 1944-45 with a kill of 9,099. Another club from 192 guns in 1943-44 with a kill of 1,822 to 506 guns in 1944-45 with a kill of 3,121. Another club with 558 guns in 1941-42 killed 3,740 ducks and in 1944-45 with 842 guns killed 9,143 ducks.

It is my opinion, in view of all the facts, that we are not yet ready for a daily limit of fifteen. We should be satisfied, until conditions are improved, with a daily limit of ten. On the marshes of all clubs, hunting of ducks should cease, with only a few exceptions, not later than noon and in many marshes not later than ten a.m. The days of unregulated hunting are gone forever. The people of Louisiana with care and appreciation of the great value of our wild life resources will enjoy for many years the finest hunting to be had on this continent.

DUCK KILL BY SPECIES
AS REPORTED BY THE LICENSED CLUBS

Species	1941-42	1942-43	1943-44	1944-45
Mallards	18,649	22,915	31,155	40,128
Pintails	9,694	11,296	10,958	12,458
Gadwalls	2,836	3,008	5,551	5,120
Widgeon	1,700	824	1,243	2,099
Green-winged Teal	2,016	1,782	1,156	4,810
Blue-winged Teal	894	924	1,537	3,269
Spoonbill	1,107	1,559	1,753	3,146
Redhead	172	296	327	187
Canvasback	444	956	582	261
Dos-gris	2,509	379	403	1,246
Ringneck	3,081	2,864	2,341	5,102
Bufflehead	273	123	207	224
Coot	3,242	2,874	2,658	1,629
Snow Goose	266	193	105	621
Blue Goose	1,475	688	662	2,277
White-fronted Goose	46	58	21	129
Canada Goose	417	472	294	496
Miscellaneous	3,325	1,828	780	971
TOTAL	52,146	53,039	61,733	84,173

Note: Coot have been added to above tabulation. Because of this the above totals are larger than total kill of ducks and geese in first tabulation.

REPORT OF THE CHIEF BIOLOGIST

JAMES NELSON GOWANLOCH,

Division of Fish and Game

GOWANLOCH

The writer herewith presents a report covering his activities as Chief Biologist of the Division of Fish and Game during the biennium, 1944-1945.

This report is not complete inasmuch as his responsibilities extend beyond the Division of Fish and Game to other Divisions of the Department of Wild Life and Fisheries, as well as to other Departments of the State.

Since four imperatively necessary programs of research concerned specifically the Division of Oysters and Water Bottoms, explicit though compact statements of three of these researches will be found in the report of the Division of Oysters and Water Bottoms on page 183 of this Biennial.

These four investigations covered: (First) The establishment of indole as an index of the condition of oysters to be used for canning or of oysters that have been canned. (Second) The effects upon oysters and other economically valuable resources of the underwater explosion of heavy dynamite charges necessary for use in the shift from reflection seismographic shooting to refraction seismographic shooting. (One section of this report appears below.) (Third) The practicability of regulations proposed and subsequently promulgated by the U. S. Public Health Service covering the control of oyster producing areas whose produce entered interstate commerce. (Fourth) The proposed promulgation and tentative establishment of "drainage" and "count" standards controlling Louisiana oysters entering interstate commerce which regulations, if passed and enforced, would overnight have destroyed Louisiana's part in raw shucked oyster interstate commerce.

These scientific problems all of which were of critical importance to the welfare (and in the last instance cited involved even the survival) of the oyster industry of Louisiana required pioneer research work, in the planning and execution of which the writer was primarily concerned. The results of these studies, for reasons of space, are reported in the Division of Oysters and Water Bottoms section of this report as indicated above.

EFFECTS OF SEISMOGRAPHIC DYNAMITE UNDERWATER EXPLOSIONS ON MARINE AQUATIC LIFE

The necessity for speeding up seismographic exploration for oil in the Gulf of Mexico, a necessity, because of war conditions, made it imperative that the effects produced by underwater dynamite explosions on such valuable marine life as oysters, shrimp and fish be scientifically ascertained.

The use of reflection instead of refraction shooting in seismographic work involved an increase from an allowable of 50 pounds of dynamite per shot to a requested use of as much as 800 pounds in a single charge.

The writer, together with John E. McDougall, former Geophysicist of the Division of Oysters and Water Bottoms, planned, executed and reported an extensive series of experiments and together prepared the following statement of results.

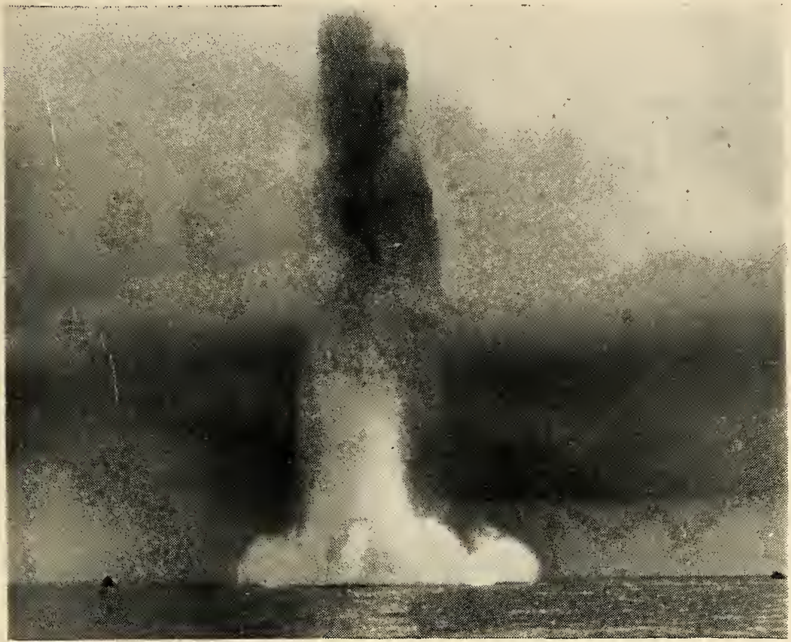
The reader should note that the experimental series described in this section concerned the effects of the explosions of such dynamite charges on fish and shrimp. A second and also extensive series of experiments to investigate further the effects on oysters is discussed in a section included in the report of the Director, Division of Oysters and Water Bottoms, Louisiana Department of Wild Life and Fisheries.

Four years ago, James N. McConnell, Director of the Division of Oysters and Water Bottoms, established a systematic supervision of seismograph exploration on land and water throughout Louisiana to protect the natural resources of the State. The Department of Wild Life and Fisheries provides an individual inspector for each survey conducted in "restricted areas." The cost of this supervision is borne by the oil company concerned while the Department of Wild Life and Fisheries alone appoints and controls the inspectors. Permission from the Commissioner of the Department of Wild Life and Fisheries must be secured before any company can begin a seismic survey and the Commissioner designates when, where and how such exploration shall be conducted. All this control was transferred to the Department of Wild Life and Fisheries when the former Department of Conservation became, by constitutional enactment, three separate State Departments.

Oil exploration is an expensive business, the operations of a single crew costing as high as $40,000 a month. Two methods of shock wave technique in the search for oil concealed beneath sea and earth are used, reflection and refraction. Reflection, involving the use of small dynamite charges, produces shock waves which travel downward until they reach a formation which reflects them back to the surface. Their course, plotted by scientists, reveals the nature of the earth's structure in terms interpretable by geophysicists and geologists. Reflection shots, covering relatively short distances, are used for securing details in exploration. Refraction involves the use of heavier charges, whose explosion sets in motion waves that travel long distances in the formations before returning to the surface speeding up four times or more the search for knowledge of oil structures. Refraction shooting requires charges up to 800 pounds and sometimes higher to cover this longer distance.

Firing off a heavy dynamite charge in the Gulf of Mexico, without technical, experimental procedures means exactly nothing.

It becomes necessary to plan and execute critical biological experiments. These require that selected animals (in these experiments, shrimp (Penaeus setiferus) fish (Croakers) and oysters be held under observation in carefully constructed cages, arranged at spaced intervals over the shot area (intervals were 50 ft., 100 ft., 150 ft., 200 ft., 300 ft., 400 ft.) examined immediately before and immediately after the explosion, and examined subsequently at two intervals, 24 and 48 hours after the shot. We can then learn what happens to individual shrimp, fish and oysters, whose condi-



Dynamite shot of 800 pounds sends water 300 feet in the air. Vessel on right is a large shrimp lugger. Vessel on left carries recording instruments for photographing string-galvanometer deflection caused by the compression wave. Permanent record is made on rapidly moving photographic paper.

tion before the shock has been demonstrated to be normal and the condition of these identical groups of animals subsequently, accurately observed.

Such critical experiments the writer and John E. McDougall planned and executed.

Full recognition is justly here given to the Magnolia Petroleum Company and to its contract crew, the McCollum Exploration Company, who contributed the use of a five boat fleet and their crews and technical staff to these important operations. Additionally, they constructed special geophones (complicated electrical instruments that register and photograph in a continuous record divisible into one-hundredth second intervals, the progress, rising force and duration of the shock wave resulting from the dynamite blast). These geophones were placed with the experimental cages so that a synchronous scientific record of the physical characteristics of the shock wave is available for correlation with biological results obtained in the experimental cages.

The definitive experiments included one 200-pound shot and two 800 pound shots, each of which used separate series of cages containing completely different sets of experimental shrimp, fish and oysters. A control box with similar specimens was located beyond the range of any shock effects.

The 800-pound dynamite charges failed to injure in any way shrimp exposed to this shot at the distance of only 50 feet. Furthermore, these shrimp still remained normal six days after the explosion. Yet the shock shook an oyster-lugger ten miles away.

The fish (Croakers) were evidently unharmed at a distance of 200 feet and in one instance two croakers survived at a distance of 150 feet. All croakers nearer than 150 feet to the 800-pound shot were killed. No differential mortality could be found among the oysters but for various biological reasons the senior author considered that more experimental work was necessary before a satisfactorily definite decision would be reached.

Line for one of the 800-pound shot series. Cage is being slowly towed into position to avoid any possibility of damage to experimental animals.

Astonishing indeed, to the layman, is the conclusion that as far as shrimp and fish are concerned the 800-pound charge, although sixteen times as great, produces at a radial distance of 200 feet, biological effects that, for practical purposes, are similar to those produced by a 30-pound charge. This seeming paradox is, however, in strict accord with the fundamental, established physical theory involved. The concentrated release of energy that occurs in the explosion of a dynamite charge is presumably chiefly absorbed in friction among the water molecules and its force, which is the measure of its power to do biological damage, declines with amazing speed as the shock wave travels outward.

The amplitude of this wave was accurately recorded by the geophones attached to the experimental boxes and the course of decrease in shock scientifically plotted.

One additional important aspect of the use of higher dynamite charges is that it will involve the use of only one-fourth the number of explosions and, since each charge effects damage within but a narrow radius (200 feet), irrespective of whether it be 30 pounds or 800 pounds, the actual sharply localized damage done by the total of shots will thus be reduced profoundly.

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Why then does 800 pounds of dynamite which is over twice the charge used in an "ashcan" to smash a Nazi submarine at 50 feet fail to injure in any way a shrimp at exactly the same distance? The answer is to be found chiefly in the size differential of shrimp and submarines in relation to the wave lengths of the shock. The shock wave speeding at approximately 4940 feet per second in water has opportunity to equalize the stresses on both sides of a small object like a shrimp vastly more rapidly than it can when presented with the massive silhouette of a submarine. The blow that buckles the submarine plates is the sum of this combination of vastly high pressure and large area.

The further biological and physical interpretation of these experiments will be published in both geophysical and biological technical journals. The problems their interpretation presents in view of the knowledge that we have gained of the effects of high explosive artillery shell-fire and of "block buster" bombing, together with researches in anti-

The writer examining experimental animals. Note central division of test cage.

submarine warfare all fall into a most interesting, coherent pattern.

The writers propose to conduct additional experiments designed to provide correlatable data covering the practical biological effects of the explosion of small dynamite charges placed in earth near small bodies of water and directly in small bodies of water. It is well known that under such circumstances charges of even five pounds are at times highly destructive. This superficial contradiction (when contrasted with the offshore 800-pound experiments) is perfectly understandable in scientific terms but it is the wish of the writers, nevertheless, to fulfill by the performance of carefully planned experiments, the full pattern of this contrast.

Special additional investigations planned, executed and reported by the writer together with John E. McDougall, former Departmental Geophysicist, Division of Oysters and Water Bottoms, Louisiana Department of Wild Life and Fisheries, will be found discussed in the section contributed by the writer to the report of the Director, Division of Oysters and Water Bottoms elsewhere in this Biennial.

LAKE MANAGEMENT STUDIES BY BIOLOGICAL COUNCIL

As another example of cooperation with other State Departments might be cited investigations of lake management.

The writer in 1934, at the time of founding of the State Parks Commission of the State of Louisiana, was appointed consulting biologist (without salary) to that body.

It was not possible, because of lack of funds, to carry out any other than cursory consultative work until a year and a half ago. The State Parks Commission, interested by serious biological problems that arose in Chicot Lake, Chicot State Park, provided funds for planned work.

The writer, therefore, with authority from the State Parks Commission, proceeded to establish a biological council, the members of which (all serving without salary) conduct scientific surveys and programs of experimental investigation designed to solve important problems of Loui-

(Photograph by Dr. Walter G. Moore)

Chicot Lake, Chicot State Park. Scene near the Experimental Station of the Louisiana Department of Wild Life and Fisheries, where investigations to provide information for maintaining State lakes at highest possible recreational values are being conducted.

(Photograph by Dr. Walter G. Moore)

Chicot Lake, Chicot State Park. Four members of Advisory Biological Council at Spillway overflow. Left to right, Professor William G. Penfound, Tulane University; William W. Wells, Acting Director State Parks Commission; Frank McFarland, Engineer, State Parks Commission, and James Nelson Gowanloch, Chief Biologist, Department of Wild Life and Fisheries.

siana State Parks management and thus aid in the development of fisheries and wildlife resources in these State Parks. This council, of which the writer is chairman, has as additional members, Dr. William G. Penfound, Professor of Botany, Tulane University, Dr. Walter G. Moore, Professor of Zoology, Loyola University, William H. King, Chemist and Chief, Chemical-Toxicological Section, Louisiana State Department of Health, Joseph E. King, of the Federal Fish and Wildlife Service, Department of the Interior, William W. Wells, Acting Director, State Parks Commission, and Frank McFarland, Engineer, State Parks Commission.

This committee has undertaken fundamental investigations, the results of which have already been of high practical value.

One reference to this work may be of interest.

A plant, termed by most laymen simply "moss", the technical name of which is *Cabomba carolinensis* (oddly enough a member of the Water Lily Family which it resembles in no way in appearance) had become abundant at Chicot Lake in Chicot State Park to such a degree that it rendered the fishing recreational use of this lake in large part impossible. This Biological Council, by lake "drawn-down experiments" has, it is clearly indicated, established a practical method whereby this plant can be controlled and the high fishing recreational values of the park can be and are being restored without, in the least degree, impairing any usefulness of the area since the lowering of the lake level occurs during a time of the year when sport fishing is not carried on. Reference to an accompanying illustration will show the appearance of three of the plants above mentioned, vis: Cabomba, the American Lotus, and the Water Shield.

The program of work projected and in conduct by this Biological Advisory Council of the State Parks Commission also provides results relating to other questions of lake management, pond management, and water fowl area management, that will be made immediately availble to anyone interested in corresponding problems in private lands or waters.

(Photograph by Dr. Walter G. Moore)

Upper end of Lake Chicot, Chicot State Park. Site of researches in lake management important for Louisiana sportsmen conducted by Advisory Biological Council.

The writer planned and conducted certain preliminary experiments concerning the application of the "fertilization" technique for control of objectionable under-water plants in Lake Chicot. The results revealed that, although these procedures (as careful research has demonstrated) are valuable for small water areas, they are, under the circumstances existing at Lake Chicot, economically impractical for the large water area (2000 acres) involved.

SPECIAL STUDIES OF DISSOLVED OXYGEN

One special problem of great practical importance in any lake management program is being investigated specifically by the writer together with William H. King, Chief, Chemical-Toxicological section, Louisiana State Department of Health, who is a member of the Advisory Biological Council referred to above.

This problem is to work out an acceptably accurate method for the rapid colorometic quantitative determination of dissolved oxygen.

The amount of oxygen available in solution in any lake or stream is one of the most significant factors in the welfare, survival or death of fishes and other aquatic life. Very many chemical methods for quantitatively analyzing dissolved oxygen present have been devised but these involve titration equipment that must be used with a precision that could not be expected of any game warden or field agent other than a scientist.

The researches indicated above undertaken by the writer and W. H. King have already given clear indication that they may provide the needed answer—a method that in the hands of an intelligent field warden, who is not a scientist, will nevertheless provide data that will instantly indicate to a scientist the approach of a dangerous oxygen situation in any body of water.

The writer has continued his cooperation with the enforcement officers of the U. S. Fish and Wildlife Service in providing, when called upon, identifications or other technical data needed in the prosecution of law violators.

SHRIMP INQUIRIES

The writer has cooperated with the Enforcement Division of the Louisiana State Department of Wildlife and Fisheries in providing the necessary technical identifications for the administration of the shrimp and other laws.

Because of the popular confusion that exists concerning three of the four species of marine shrimp that occur in the commercial catch the writer strongly recommends that the Department educate, as far as is possible, the commercial fisherman in a knowledge of the three species that contribute to this confusion, namely: 1. The usual so-called "Brazilian" shrimp (for which the name "Red-Grooved" shrimp is recommended by the writer). 2. The unusual "White Brazilian" (for which the name "White-Grooved Shrimp" is recommended), and 3. The so-called "White" or "Native" shrimp that contributes the vast majority of our shrimp catch, (for which the writer recommends the name "Common Sea Shrimp"). The Sea Bob, "Six Barbes" is readily distinguished by experienced fishermen from any of the other three.

The chief enforcement trouble arises from the fact that the "White-Grooved" Shrimp is confused by the fisherman with the "Common Sea Shrimp" and the completely wrong rumor is spread that the Department of Wild Life and Fisheries is permitting the destruction of young "Common Sea Shrimp" which it never has under the present Administration.

DUCK FOOD PLANTING PROCEDURES

The management of marsh and water areas for waterfowl is a subject concerning which we receive constant inquiries. Research work is being continuously conducted by the writer as is elsewhere indicated in this report. Large scale control experiments in rehabilitation of duck marsh would be productive of very valuable results if funds and personnel could be secured.

Each area must, to a considerable degree, be regarded as a special problem, particularly where brackish water and salt water invade the specific region since changes in salinity profoundly affect the success of valuable duck food.

In general, three duck food plants can be recommended in Louisiana for anyone attempting to improve food conditions for holding waterfowl in their areas. These three plants are the Delta Duck Potato, *Sagittaria platyphylla,* the Banana Water Lily, *Castalia flava,* and the Chufa grass (*Cyperus esculentus*). The writer believes that experimental planting of these species is thoroughly worthwhile. Chufa can be purchased in the form of nut-like tubers, which are available through seed dealers and cost about eighteen cents a pound. Chufa will not succeed unless the bottom of the area where it is planted is dried out and exposed for at least part of the year. It is recommended that Delta Duck Potato and Banana Water Lily be secured directly from local or Louisiana stock. Both are among the most desirable of all duck foods.

Delta Duck Potato should be planted in shallow (preferably 5 in. depth) water and spaced about 5 feet apart. May and June are best months for transplanting, although planting can be done any time during the Summer. This species flourishes on mixed sand and clay but will thrive on practically any lake bottom.

Banana Water Lily can be planted at any time of the year except the dead of winter, although the extreme heat of summer is somewhat unfavorable. Banana Water Lily will run about 150 to 175 plants to the skiff load and in one experiment performed 1½ skiff loads planted developed in a few months a solid half-acre stand of valuable waterfowl food. Six man days in another instance resulted in an excellent three-acre growth of Delta Duck Potato.

Banana Water Lily should be planted in about 18 inches of water.

Where duck food plantings are made it has been found desirable to fence off and mark with signs chosen "duck food nurseries" which, if strategically placed, will be protected from browsing by cattle and will spread, by water currents and other means, widely over the duck marsh.

Four serious plant enemies of successful duck food growth are the American Lotus (*Nelumbo pentapetala*), the Water Shield (*Brasenia schreberi*), the Alligator Weed, (*Alteranthera philoxeroides*) and the Water Hyacinth

(*Eichornia crassipes*). Each of these, if uncontrolled, will destroy any attempts to produce duck food.

The writer has conducted other duck food investigations and has cooperated in the carrying out of experimental studies of these problems.

FROG RAISING INQUIRIES

No inquiries received by the writer exceed in number those concerning the possibilities of artificially breeding Bullfrogs for the commercial market. The writer, after 15 years experience in the State of Louisiana as Chief Biologist, has come to the conclusion that frog farming, even under the ideal climatic conditions that exist in Louisiana, has yet to be proven a profitable commercial venture. Frogs which are utilized in the market are obtained as a result of the activities of frog hunters in the natural breeding areas of the Bullfrogs. Attempts to concentrate Bullfrog populations and turn out factory-scale production involve a wide variety of biological complications such as the increase in numbers and kinds of parasites, the difficulties of providing adequate food supplies (since Bullfrogs will eat only moving food), etc., that these frog-raising projects, as far as the writer has been able to observe, end in financial failure. The writer will be very glad at any time to indicate the wide variety of sources from which frog so-called "breeding stock" can be secured at the standard food market sale price, which will permit anyone desiring to experiment with frog raising to conduct such a venture without excessive expense. Any list so provided will name all the dealers of which the Department has knowledge and will of necessity bear no guarantee as to such transactions or their results. It should be remembered that there are two species of Bullfrogs in Louisiana, namely, the Common Bullfrog, *Rana catesbeiana,* and the Southern Bullfrog, *Rana grylio. Rana grylio* is smaller and should not be used for farming. *Rana catesbeiana* occurs all the way from the Gulf of Mexico up to Nova Scotia and is the frog that is desirable.

There have been many statements about special giant bullfrogs offered by private companies, but on examination by the writer, these have been found to be simply *Rana catesbeiana,* our native species.

THREE OBJECTIONABLE MEMBERS OF THE WATER LILY FAMILY

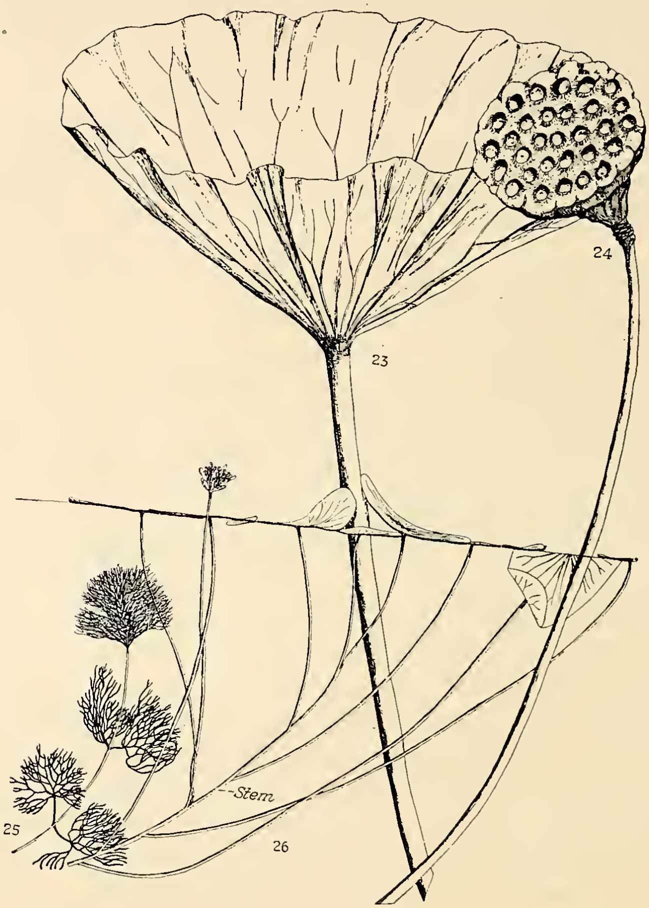


Figure 25. Underwater foliage of **Cabomba caroliniana,** usually known locally as "Water Moss." The small, usually white, (sometimes deep pink) flowers emerge conspicuously above the water. This valuable plant provides oxygen and shelter for fish life and fish food organisms. Occasionally, as in Chicot Lake, it may become over-aboundant and require control.

Figure 26. The Water Shield, **Braseina Schreberi.** Floating leaves, bright green above, lovely red below. Underwater plant parts covered with thick transparent gelatin. Small, un-water-lily-like emerges and is conspicuous green and brown. Good food for ducks but a bad plant for fishing lakes.

Figure 23. Leaf of American Lotus, **Nelumbo pentapetala.**

Figure 24. Characteristic fruit of American Lutus showing large seeds. The leaves stand above the water when young, later float and lack the usual water lily leaf cleft. This plant will completely destroy the usefulness of water areas for fishing and water fowl. (Copyright illustration from "Fasset," "A Manual of Acquatic Plants" by permission of McGraw-Hill Book Company, Inc., New York and London.)

Frogs are notoriously intolerant of brackish waters and any area used should necessarily be completely fresh water.

Frog marsh management necessarily involves certain protection from such predators as watersnakes and other animals that feed upon either the tadpoles or the growing and adult frogs. Certain water birds, such as herons, are very destructive.

Any specific questions regarding frog problems or identifications the writer will be glad to endeavor to answer.

SCIENTIFIC LAKE STUDIES INAUGURATED

Instructed by Major James Brown, director of the Division of Fish and Game, Louisiana Department of Wild Life and Fisheries, the writer cooperated with him in the planning and the immediate supervision of a scientific investigation of problems of the causes of "fish kills" in Louisiana lakes.

The services of Dr. Walter G. Moore, Assistant Professor of Biology, Loyola University, were secured to conduct this research, which occupied the months of June, July and August, 1945. Dr. Moore took leave of absence from the university during this period and established his headquarters at the scene of operations.

A "fish kill", source of greatest concern to sportsmen everywhere in Louisiana, may be described as a sudden, and, to the layman, unpredictable death of disastrously large numbers of fish in lakes or ponds due, as far as the sportsmen can observe to no understandable cause. The investigation and analysis of the patterns which these "fish kills" follow are therefore matters of highest scientific value and equally of highest practical importance, particularly since the destruction of dishearteningly vast numbers of fish within the period of perhaps only a few hours, may result from completely different causes.

The body of water chosen for this initial study was Lake Providence, East Carroll Parish, Louisiana, where notoriously devastating "fish kills" have been observed for long periods of time, some years several, some years one, some years none.

The exact studies completed by Dr. Moore form the basis of a valuable report which he has submitted comprising 41 pages of text together with additional maps, plates and tables of chemical and meteorological data.

The conclusions (necessarily tentative, because additional studies will be required) give a reasonable answer to the question, "What is the cause of these kills?" and includes possible remedial measures.

It is extremely important for the practical management of our Louisiana lakes in terms of effectively maintaining their recreational values that this or similar scientific studies be continued. The technical data of Dr. Moore's report will be published and the interpretation of these data and the means of the practical application of his results will be made available to the layman.

Periodic observations are being conducted by Dr. Moore so that the biological picture of the lake under study can be more completely filled in.

Arrangements are under way for comparable studies of other important lakes of Louisiana.

It is only upon such a basis of scientific facts that planned lake management can become effective in Louisiana.

"FISH KILL" STUDIES

The writer on instructions of the Commissioner conducted a study of a "fish kill" in Miller's Lake, Evangeline Parish. This area, notable for both game fishing and waterfowl hunting, suffered an extremely heavy fish kill that was confined to certain areas. The writer's investigations revealed that the critical factor was the abundance of American Lotus (an illustration of this plant appears elsewhere) resulting in the death of underwater oxygenating plants, together with the additional serious result of preventing oxygenation of the water by wind action. The oxygen was reduced to virtually a zero reading and fish died by the thousands. Moribund, Large-mouth Black Bass, when transferred to oxygen containing waters, immediately recovered. Re-examination of the lake in the winter months when the American Lotus plants had died back, revealed oxygen saturation in the areas formerly fatal to fish.

MINK FARMING

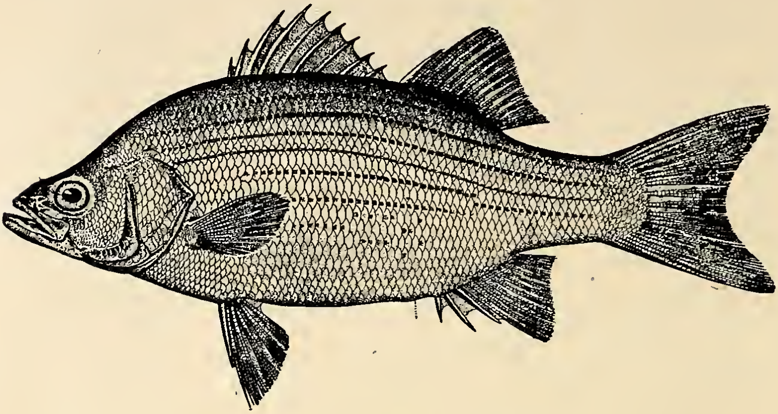
Mink farming in Louisiana, concerning which the writer receives many inquiries, is a subject deserving of possible experiment since in spite of the heavier pelage of northern bred mink, Louisiana conditions may well, in other ways, compensate in a high degree by reducing the cost of mink farming operations. As far as the writer has been able to ascertain no serious attempt to raise mink has ever been tried in this State. Mink farming elsewhere in the United States has become a standard, highly profitable industry. The mink farm pelts often command double the price of the pelts from "wild" mink.

Muskrat farming, in sharp contrast, has never been economically successful as far as the writer can ascertain anywhere in the United States.

MISCELLANEOUS ACTIVITIES

During the period herein reported the writer provided various technical and other published papers and technical and other addresses covering the activities of the Department. He served during the present year as Vice-President of the New Orleans Academy of Science, which body he addressed on various occasions, also addressing the Louisiana Academy of Science. He also served as one of the Technical Chairmen of the Tenth North American Wildlife Conference which was called the Spring of 1945 in New York City. Due to War transportation regulations it was not possible at the last moment to hold the Conference but the sectional program which he arranged was printed and distributed by the American Wildlife Institute making available the scientific materials as completely to the readers as if the Conference had been held. To this program the writer contributed an address on the subject of Water Hyacinth.

The writer, at the request of the Commissioner, has prepared and is publishing a series of compact descriptive and illustrated accounts of the game, commercial, and unusual (in appearance) fishes in Louisiana, nineteen numbers of this series have already appeared. Correspondence and comment make clear that they fulfill a definite need. The series is being continued.



White Perch or Barfish, **Lepibema chrysops,** illustrated and described in the series, "Know Your Louisiana Fish". The White Bass is often badly confused by sportsmen with the Yellow Bass, **Morone interrupta,** and the Striped Bass, **Roccus saxatilis.** Familiarly known as Barfish this species provides excellent sport.

NEED FOR CHEMICAL STUDIES

The writer has been extremely apprehensive of the potentially dangerous effects (particularly upon game and commercial fish) of the indiscriminate use of certain newly applied chemicals, namely: 2-4 dichlorophenoxyacetic acid (2, 4-D), used as a herbicide, dichloro-diphenyl-trichloroethane (DDT) used as an insecticide, and sodium fluoroacetate (1080) used to kill rates and mice. He has cooperated in direct analytical experimental evaluation of some of these effects. The results are disconcerting. It is clear that the uncontrolled use, particularly of DDT on water-sheds feeding fish productive waters, may result not only in direct toxic effect on fishes, but, much more seriously, will destroy essential links in the food chain upon which game and commercial fish depend for their welfare.

GULF BIOLOGICAL STATION NEEDED

Serious consideration should be given to the problem of establishing an adequately equipped, competently staffed Biological Station in coastal Louisiana where problems of highest economic importance could be scientifically investigated. The extraordinary water conditions that arise as a result of the influence of the flow of the Mississippi River are primary factors in the welfare for example, of such highly valuable resources as Muskrat, Blue Crabs, Oysters and Shrimp. The Mississippi River alone is responsible for the fact that Louisiana produces practically 50% of all the Muskrat pelts in the entire country and also for the fact that Louisiana's coastal waters contribute 75% of the total shrimp production of the United States and Alaska. Favorable conditions for oyster culture excell those of any other state in the Union.

GAME FISH FARMING

The writer believes that legislation should be enacted to permit the legal sale of artificially reared game fish. The present situation is that people seeking to stock ponds or other private waters are only able to secure fish from the relatively inadequate supplies afforded by the Federal Government. Other states permit the sale of such privately reared game fish which is a procedure completely comparable with the legal sale in Louisiana of artificially reared game birds. The writer has received very many inquiries from returned veterans whose interests keenly relate to fishing and fish management, and it seems clear that not only would such rearing of game fish constitute a profitable enterprise for such men, but such activities would to a valuable degree be of service to persons wishing to stock private waters. Many requests from individuals and private groups are received indicating that there is a lucrative market for fish so reared. The licensing of such game fish breeders (in the same manner the game bird breeders are licensed) would keep such activities under adequate control and should not complicate enforcement problems.

SCIENTIFIC CRAB STUDIES NEEDED

Louisiana coastal waters, for biological reasons, provide ideal conditions for natural crab production (the "Blue Crab" *Callinectes sapidus* of commerce).

There is every reason to believe that the crab industry is capable of immense expansion in the State. The fact remains that, due to lack of funds and lack of personnel, no systematic specific scientific investigations of crab life history have been carried on in Louisiana. Such studies properly planned and executed would, undoubtedly, provide information of immense economic value to the State and should by all means be undertaken as soon as possible. Importance of this can be instantly realized by contrasting the remarkable crab "nursery grounds" of Louisiana with the greatly more complicated and greatly less favorable conditions that exist in Maryland and Virginian waters, which states, in spite of these conditions, support highly valuable commercial crab industries.

STATE SHRIMP STUDY RESUMPTION URGED

The writer regards it as vitally important that the Department of Wild Life and Fisheries' participation in shrimp investigations be resumed as soon as is possible. The shrimp investigations conducted cooperatively with the Fish and Wild Life Service of the Federal government (initiated with the then Biological Survey) has accumulated highly valuable information designed to provide the basis for proper regulation of the shrimp industries in order that the continued profitable productivity of that industry be maintained. Among the participating recent activities of the Department of Wild Life and Fisheries (then the Department of Conservation) was the maintenance of a scientific laboratory with a properly qualified biologist at Morgan City. This investigation was of extreme importance because the "jumbo" shrimp offshore fishery (a development of the last 8 years), reported a utilization of highly desirable shrimp that never previously had been harvested. The activities of this laboratory were, unfortunately, inevitably suspended because of the loss of personnel due to the war.

TITANIUM PLANT INVESTIGATIONS

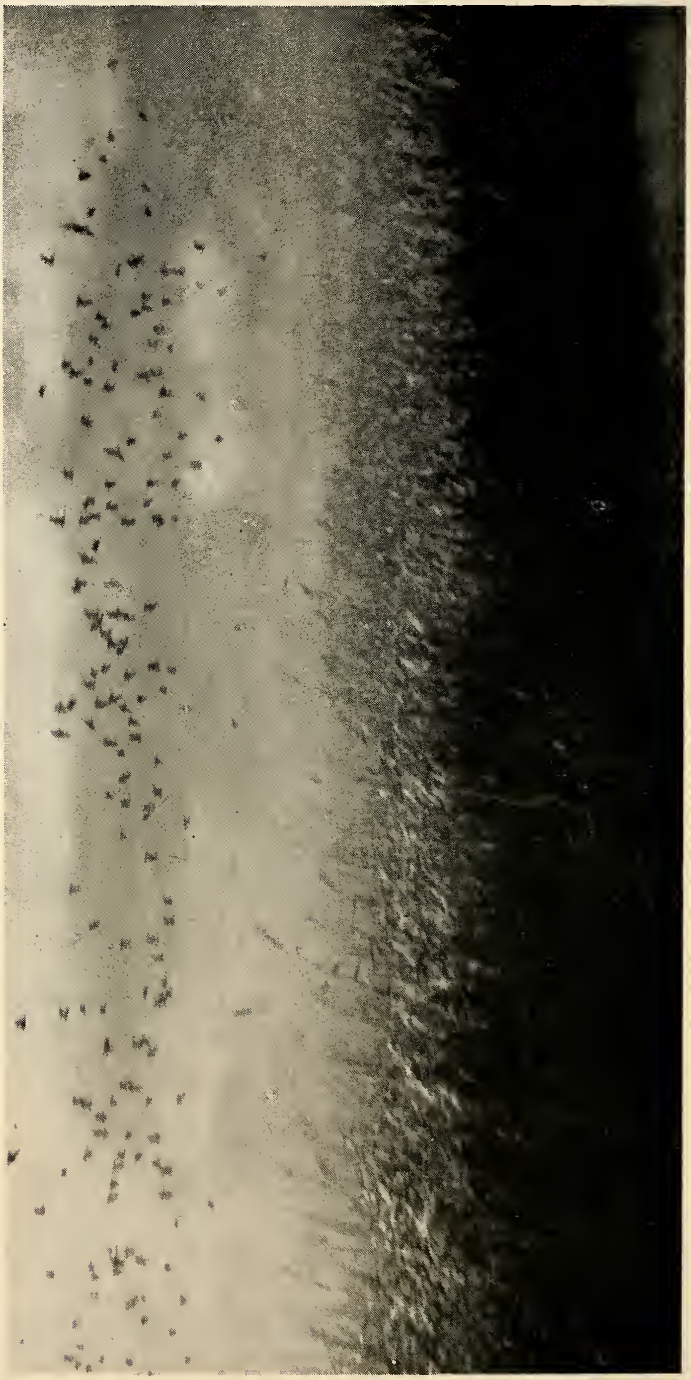
Instructed by the Commissioner and by Major Brown, the writer, together with William H. King, Chief, Chemical-Toxicological Section, Louisiana Department of Health, and Louis Cusachs, Director, Research and Statistics, Louisiana Department of Wild Life and Fisheries, planned, executed, and reported upon a comprehensive study of the possible polluting influences of the effluents of a titanium dioxide producing plant on the Mississippi river. This work was done at the request of the State Department of Commerce and Industry. These researches involved a week of scientific observations, collection of samples and analyses at St. Louis, Missouri, where such a plant is in operation, followed by many weeks of additional work in the analyses, integration and evaluation of hundreds of additional samples, together with the correlation of these chemical data with the hydrographic data (flowage, hydrogen-ion concentration, sedimentation, etc.) of the Mississippi river both at St. Louis and at two stations in Louisiana.

A 19-page report, accompanied by tabulations of chemical analyses and diagrams showing clearly the distribution and fate of the possible polluting substances in the river was jointly prepared and presented by the three investigators.

This report provided a compact contribution of carefully prepared original data upon which, in part, could be based subsequent decisions regarding the control of such an industry in the State of Louisiana.

INQUIRIES ANSWERED

The writer continued to receive and to answer the usual stream of inquiries regarding identifications of specimens, sources of biological materials, trends and availabilities of commercially important biological resources, etc. Particularly numerous were, as has been, in part, indicated above inquiries relating to frog farming, shrimp fishing, and commercial fishing.



Waterfowl in flight on Louisiana's game refuges.

FUR AND REFUGE DIVISION

ARMAND P. DASPIT, *Director*

DASPIT

This report covers the activities of the Fur and Refuge Division of the Louisiana Department of Wild Life and Fisheries for the seasons 1943-1944 and 1944-1945.

Louisiana is the leading fur-producing State in the Union and produces fur-bearing non-game quadrupeds in the order of their importance in the fur markets as follows: muskrats, opossums, raccoons, mink, skunks, "civet cats" or little spotted skunks, otters, wolves, foxes and weasels. Nutria has recently been introduced in this State and they are propagating rapidly.

There has been some speculation over the effects of the severe storm of April 1, 1945 on wildlife of Louisiana coastal parishes, particularly the muskrat, which is the principal fur-bearer of this region.

The inundation of salt water throughout the marshland undoubtedly took its toll of the muskrat population. The muskrat has no such organization as the Red Cross to assist in the evacuation of his domicile when flooded by high waters. It is true that he is amphibian, accustomed to an aquatic environment, but in the face of the terrific gales that swept across his home-land, and the tidal waves that destroyed his nest and the food supply which he had stored against a "rainy day"—but not quite so rainy—it is indeed the application of the law of Nature that only the fittest shall survive.

The young muskrat, not yet having acquired the strength and experience to contend with these wild elements of Nature, is the one most likely to be reported missing when the winds have subsided and the waters recede. Separated from the older members of his family, the little fellow swims around as best he can, seeking a landing spot in that strange bedlam of "sound and fury"—perhaps

Typical trapper in front of a muskrat home.

frightened by the crash of thunder and the flash of lightning—certainly confused by the tidal waves of salt water that sweep over him in apparently unending procession, perhaps burying him in a water grave of three-cornered grass, which is the muskrat's heaven.

Old-time trappers tell us that these little ones are blinded by the salt water, and while there is no scientific confirmation of this, it is a fact that the muskrat is accustomed to brackish water, which is a combination of fresh and salt water, and no doubt the high salinity of the hurricane water would prove disconcerting if not fatal. In the struggle for survival it might prove too great a handicap for the weaker members of the family.

The muskrat is a very domestic animal, devoted to the members of his family. When either or both of the parents are lost, the elder brothers and sisters will fend for the younger ones, going out to forage for them—searching for them and bringing them back to the family nest. One can imagine that in the case of a tropical storm that increases in wind velocity every minute, and the consequent onrush of high waters, there is every effort made by these elders to protect the little ones—and as the storm reaches a crescendo of fury and destruction it is a real test of muskrat courage and fortitude.

As the waters recede one might surmise that there would be some ambition on the part of the adult muskrats to reestablish their homes, to rear new families—to start life over again. But the mating period has passed—the muskrat is non-polygamous and it is difficult to picture him in a new home, surrounded by a new litter of little ones. Even if he were so disposed, the storm has played havoc with this habitation. He is a strict vegetarian and it will take time to restore the grasses which are necessary to an abundant life in muskrat-land.

Louisiana leads all other American states in the production of muskrat, which yields from three six million pelts yearly. The hurricane of April 1st, 1945, may cut this yield considerably, although it would take a hardy soul to make any estimate at this time.

The muskrat is a protean fur, being used extensively in the reproduction of imitation of other furs under various trade names. When there is a shortage in the muskrat crop, the dealers will turn to some other fur that will serve as a substitute, even though it may not have the quality or durability of muskrat. This tends to restrain any advance in price that might naturally be anticipated.

The mink found in Louisiana was not considered in past years as being of a richness to compare with mink secured in the North, but so popular is this short-haired skin that the Louisiana mink is taken by expert furriers and blended into a rich deep brown so that the finished garments now compare very favorably with Northern pelts.

The raccoon, and even the wild cat, is becoming one of the most widely worn of American furs, and the opossum is rapidly growing in popular favor as an inexpensive fur.

The only native species of fox in Louisiana is the gray fox, which prefers dry, well wooded country. The red fox has been introduced into the state by fox hunters but has never become plentiful.

NUTRIA

On October 11th, 1930, I received a bulletin from Mr. G. Muller of Buenos Aires offering to this Department South American Nutria. I immediately contacted the United States Bureau of Biological Survey through Dr. Paul G. Redington, Chief of the Bureau. On October 14th I received a letter from Mr. J. E. Shillinger, Acting in Charge of Fur Resources of the Federal Government, who stated that, "the Bureau had no information on Nutria except *a few* maintained in zoological parks."

I also took up the matter with Mr. Edward A. McIlhenny, who is always interested in Louisiana's natural resources and development, and he promptly procured several pairs and experimented with them on Avery Island. The colony soon grew very large and were liberated in the

Under unfavorable weather conditions, trappers are forced to improvise drying sheds in their camps.

marshes. Whereas the Nutria is in its infancy in Louisiana, I am firmly convinced that it will, in time, equal in value the muskrat production in this State.

The Nutria loves the marshes and it thrives there and, strange to say, it does not interfere in any way with the muskrat production, as the food required by the Nutria is entirely different from that of the Muskrat. In other words there is plenty place in our marshes for both species.

Below is listed the comparative takes of fur animals in Louisiana and the approximate value to the trappers in the 1943-1944 and 1944-1945 seasons:

1943-1944 SEASON

Muskrats	4,440,638	@	$ 1.44¾	$ 6,427,823.51
Mice	302,997	@	.10	30,299.70
Minks	144,717	@	4.05	586,103.85
Raccoons	208,921	@	1.15	240,259.15
Opossums	91,724	@	.50	45,862.00
Otters	2,404	@	6.00	14,424.00
Skunks	28,052	@	.50	14,026.00
Miscellaneous	11,027	@	.50	5,513.50
	5,230,480			$ 7,364,311.71

1944-1945 SEASON

Muskrats	5,577,216	@	$ 1.23	$ 6,859,975.68
Mice	385,940	@	.10	38,594.00
Minks	132,821	@	4.05	537,925.05
Raccoon	176,911	@	1.15	203,447.65
Opossums	66,000	@	.50	33,000.00
Otters	1,912	@	6.00	11,472.00
Skunks	11,155	@	.50	5,577.50
Foxes	5,124	@	.50	2,562.00
Cats	628	@	.50	314.00
Miscelaneous	988	@	.50	494.00
	6,358,695			$ 7,693,361.88

The above prices are based on O.P.A. control figures.

ALLIGATORS

SEASON	Less Than 5 Ft.	Less Than 10 Ft.	More Than 10 Ft.
1943-1944	7,843	3,840	16
1944-1945	5,941	2,975	12
	13,784	6,815	28

The Fur and Refuge Division of this Department is charged with the Collection of severance tax on all furs shipped out of the State by dealers and trappers, as well as supervision over the selling of fur dealers' and fur buyers' licenses.

Below is a tabulation of the revenues received in the Fur and Refuge Division in the 1943-1944 Season and the 1944-1945 Season.

REVENUES RECEIVED IN THE FUR AND WILDLIFE REFUGE DIVISION IN THE 1943-1944 SEASON

Resident Fur Dealer's Licenses	37	@	$ 150.00	$ 5,550.00
Non-Resident Dealer's Licenses	2	@	300.00	600.00
Resident Fur Buyer's Licenses	263	@	25.00	6,575.00
Non-Resident Buyer's Licenses	2	@	100.00	200.00
Total amount of tax collected from fur dealers				63,066.44
Total amount of tax collected from fur trappers				1,081.77
Total				$ 77,073.21

Total revenues received from the sale of furs taken from the State Game Preserves, Marsh Island, State Wildlife and the Rockefeller Preserves.

Total amount of fur sales	$379,292.41	
Less Trappers' 65%	246,540.07	
Department's 35%		$132,752.34
Department's 35% of revenues received from the sale of furs taken from the St. Tammany Game Preserve		$ 1,326.96

Department's 25% of revenues received from the sale of alligators taken off Marsh Island	$ 307.54
Sale of confiscated furs	$ 4,648.89
Revenue received for pasturage on the State Game Preserves	$ 1,079.00
Total	$140,114.73
Grand Total	$217,187.94

REVENUES RECEIVED IN THE FUR AND REFUGE DIVISION IN THE 1944-1945 SEASON

Resident Fur Dealer's Licenses	33	@	$ 150.00	$ 4,950.00
Non-Resident Dealer's Licenses	3	@	$ 300.00	900.00
Resident Fur Buyer's Licenses	286	@	25.00	7,150.00
Non-Resident Buyer's Licenses	1	@	100.00	100.00
Estimated Trappers' Licenses	12,000	@	2.00	24,000.00
Total amount of tax collected from fur dealers				71,500.06
Total amount of tax collected from fur trappers				1,211.44
Total				$109,811.50

Total revenues received from the sale of furs taken from the State Game Preserves, Marsh Island, State Wildlife and the Rockefeller Preserves.

Total amount of fur sales	$241,358.98	
Less Trappers' 65%	156,883.17	
Department's 35%		$ 84,475.81
Department's 35% of revenues received from the sale of furs taken from the St. Tammany Game Preserve		$ 1,045.92
Department's 25% of revenue received from the sale of alligators taken off Marsh Island		$ 270.20
Revenue received for pasturage on the State Game Preserves		$ 1,329.00
Total		$ 87,120.93
Grand Total		$196,932.43

Mallards feeding on game refuge.

WILDLIFE SANCTUARIES IN LOUISIANA

The activities of this department in the protection of Migratory Bird Life, we believe, will be better understood after considering a brief outline of the history of Louisiana Wildlife sanctuaries:

LOUISIANA STATE WILDLIFE REFUGE

Hon. Edward A. McIlhenny of Avery Island is entitled to full credit for the development of wildlife sanctuaries in Louisiana. In the year 1893, Mr. McIlhenny established a "Heronry" in an artificial pond on his estate on Avery Island, with a few pairs of Egrets in an effort to save this bird from extermination, and later as a duck sanctuary. In the year 1910, this Heron colony contained about 15,000 pairs of nesting birds. This experiment demonstrates the fact that year after year, if given proper protection and environment, migratory birds will return every year to the protected area.

Ducks and Geese feeding on State Game Refuge.

This experiment in wildlife conservation was the first demonstration in the world of the Sanctuary idea for migratory birds and was the object lesson according to which the first State Wildlife Refuge was established. On November 4, 1911, Mr. Charles Willis Ward of Michigan, and Mr. E. A. McIlhenny purchased the property on Vermilion Bay on great geese-raveling beach known as Hell Hole, and donated same to the State of Louisiana. It is now known as the Louisiana State Wildlife Refuge—the proportion of the gift being three-fourths by Mr. Ward and one-fourth by Mr. McIlhenny. This is the first wildlife refuge in the world, privately donated, for the public good.

MARSH ISLAND

Mr. E. A. McIlhenny was also instrumental in securing the donation to the State of Louisiana by the Russell Sage Foundation of 75,663.95 acres of land on Marsh Island in the Parish of Iberia for a Wildlife Refuge. Mr. C. W. Ward also cooperated with Mr. McIlhenny in securing this property for the State of Louisiana.

Arrangements were made for the purchase of Marsh Island in its entirety by Mrs. Sage and all those who had pledged their support to aid in the purchase were relieved of their pledges.

This property consists of:

1. From Lawrence F. Fabacher	35,855.19	acres
2. From Victor Von-Schoeler, John D. Grace and W. P. and S. I. Reymond	5,950.87	“
3. From Victor Von Schoeler and John D. Grace	10,239.58	“
4. From Richard J. Hummel, Benj. R. Mayer and Alexander D. Barrow	1,281.44	“
5. From James Webb, Alexander D. Barrow, Richard J. Hummel, and Benj. R. Mayer	19,658.81	“
6. From Ashley W. Pettigrew, Lewis J. Bass and Sam Nye Bass	293.77	“
7. From Theolin Landry	1,426.94	“
8. From The Broussard Realty Company	557.35	“
9. From Dr. J. W. Sanders	400.00	“
Total acreage	75,663.95	acres

for the price of $162,980.02.

Other parcels were purchased making a total of approximately 79,000 acres.

THE ROCKEFELLER REFUGE

Shortly after Mr. McIlhenny had acquired Marsh Island for the State from Mrs. Russell Sage, a large body of land, 86,000 acres, lying in the west Vermilion and east Cameron Parishes, bordering the Gulf of Mexico for many miles, was brought to his attention.

Mr. McIlhenny knew quite well, having hunted ducks and geese over various sections of this territory, that it was well adapted for winter feeding and resting refuge for migratory wild fowl and he determined, if possible, to secure this land also as a permanent wildlife refuge.

Wardens patrolling State Game Refuges.

After securing pledges for part of the purchase price, Mr. McIlhenny acquired the property for the price of $212,500.00 on June 12, 1913, paying $27,500.00 cash and a mortgage note for $185,000.00.

Through the assistance of Messrs. Robert W. and Henry W. DeForest the merits of this wildlife refuge plan were brought to the attention of the Rockefeller interests. After a thorough investigation, the Rockefeller Foundation purchased the 86,000 acres for a perpetual wildlife refuge, paying $212,000.00 cash for same on the 20th day of May, 1914. By Act 71, 1920, the State of Louisiana, through the Governor and the Commissioner of Conservation, were authorized to accept from the Rockefeller Foundation the donation of the above property, located in the Parishes of Vermilion and Cameron.

ST. TAMMANY REFUGE

On January 31, 1938, the Department of Conservation purchased from the Great Southern Lumber Company, Inc., of Bogalusa, Louisiana, approximately 6,000 acres of land to be used as a game refuge.

On August 10, 1943, this Department turned over to the State Parks Commission, for the Fontainbleau State Park, all of the above property.

The trapping and hunting rights and the right of ingress and egress in the exercise of such rights on 1,350 acres remain in the possession of the Department of Wild Life and Fisheries.

SINGER WILDLIFE REFUGE

This preserve contains in the aggregate approximately 81,102 acres in Madison Parish, and the use of these lands was dedicated to the State of Louisiana for a period of ten years by the Singer Manufacturing Company on October 7, 1926, and was renewed for a ten year period on October 7, 1936, in the form of a lease, which provides that:

"The consideration of this lease is that, whereas the lands herein described are timbered lands and constantly in danger of forest fires set by hunters and trappers, which have heretofore caused losses to the owner, and whereas, it is the belief of The Singer Manufacturing Company that the establishment of a State game refuge as hereinabove described, upon said lands, will result in the better protection of its property, from fires and trespassers, said protection is deemed by the owner to be an adequate consideration for the right to establish such game refuge as hereinabove set forth; and that by such State protection beneficial wild bird and wild animal life will be provided with sanctuary and undisturbed breeding, feeding and resting grounds for the preservation of the fauna of the State of Louisiana.

"The Department of Conservation of the State of Louisiana obligates itself to appoint and employ at its own expense two conservation agents, who shall be permanently stationed on the property on which said right is herein leased, in order to carry out the purposes for which said property is leased, and in addition thereto the Department of Conservation obligates itself to commission and appoint as conservation agents the timber wardens who are now employed or may from time to time be engaged and paid by the Singer Manufacturing Company as conservation agents, with full authority to act as such, who are not to receive from the Department of Conservation any compensation."

Deer and wild turkeys are plentiful in this area, and a few wolves and coyotes may be found. It is the only area in Louisiana where the panther is known to still exist.

The Singer preserve was the first to be established in the State on leased lands. It was believed the sanctuary would provide an overflow of game and birds which would make hunting in the nearby sections splendid and at the same time preserve the species of birds and animals which might otherwise die out.

Typical patrol ditch on refuge.

MOREHOUSE GAME REFUGE

On September 22, 1944 the Crossett Timber and Development Company, Inc., and others, leased to the Department of Conservation, now the Department of Wildlife and Fisheries, for a period of ten years approximately 58,000 acres of land to be maintained and operated as a sanctuary and breeding and propagating grounds for wild birds and wild quadrupeds.

PASS-A-LOUTRE PUBLIC HUNTING GROUNDS

The Pass-a-Loutre Hunting Club and refuge, consisting of 66,000 acres of the finest hunting grounds located at the mouth of the Mississippi River, is the only State owned and operated club in the United States. It is operated with no view to profit—it being simply for the recreation of sportsmen who can appreciate conservation and are disposed to pay a reasonable fee for guide service, board and lodging, to help maintain repairs, and install modern equipment.

The Superior Oil Company leased the mineral rights on Marsh Island (Russell Sage Foundation) on June 19, 1945 for $503,000 cash bonus, plus $251,500 yearly rental, and 20 percent royalty and a $5,000,000 oil payment to be paid out of an additional 1-20th royalty if production is established. I am listing below my program of work and improvements to be done on Marsh Island as soon as possible with revenues derived from mineral leases, known as the "Marsh Island Improvement Fund."

One superintendent's cottage to be built on Marsh Island	$ 15,000.00
Furniture and furnishings for above cottage	2,000.00
Two fresh water wells	16,000.00
Reworking existing eight water wells	8,000.00
Purchase of suction dredge for draining areas eaten up by muskrats and blue geese	10,000.00

Five trapper's camps	3,500.00
Ten miles dredging between sea rim and marsh as recommended by our biologist, Ted O'Neil	30,000.00
Planting of duck and goose food (over a period of five years due to scarcity and labor and transportation)	30,000.00
Barges and equipment for handling and transporting duck food	5,000.00
Filling and bulkheading around cottages and strategical points	10,000.00
Four patrol boats	16,000.00
Keeper's salary and expenses for cottage (per year)	2,500.00
Repairing and refurnishing Firman and Bird Island Bayou Camps	5,000.00
	$153,000.00

The Humble Oil Company leased the mineral rights on the Rockefeller Refuge for $568,000, and started drilling in July, 1944. However, no wells were brought in and the oil company abandoned the idea of drilling further.

Two keeper's cottages are presently being constructed on the Rockfeller Refuge. These cottages will add prestige and improve the value of the property. These buildings will permit the superintendent and enforcement agents to live on the property, thereby improving the supervision of the property. Watch towers will be built at the rear of each cottage for viewing the refuge through field glasses. The location of the cottages will permit the superintendent and enforcement agents to intercept any trespassers and persons engaged in bootlegging of furs by land.

Just as soon as the Federal Government makes lumber available, we intend to build fifteen double trapper's camps and repair all existing camps on the Rockefeller Refuge.

Director Armand P. Daspit calling out name of first successful buyer of State Fur.

Seventeen miles of ditches have been dug on the Rockefeller Refuge along the northern boundary. This work was done by dragging a plow with three marsh buggies. Ditches of this type range in width from 4 to 5 feet and 20 to 30 inches deep. These ditches were considered necessary for patrol duty and posting of an inaccessible portion of the north line of the refuge.

"NO TRESPASS" signs have been posted on all the State's game refuges.

A biological survey of the refuges is being made with a view of planting food for ducks, geese and other wildlife.

FUR TRAPPING ON STATE GAME REFUGES

Each year it is necessary for this Department to trap the predatory animals on the State game refuges in order to save the food for the ducks, geese, and other wildlife, as well as the birds themselves.

Trappers are selected by our superintendent shortly before the opening of the trapping season and they and their families are moved out on the refuges and given trapper's camps in which to live while trapping.

The superintendent and wardens patrol these refuges constantly to see that there are no violations while the trappers are on the property. Trappers are not permitted to carry firearms on the refuges. The furs trapped are picked up regularly and transported by boat to our warehouse in New Iberia. Our warehouseman counts the furs and piles them in lots in our warehouse.

After the furs are counted, the warehouseman notifies the New Orleans Office, who in turn circularizes the entire fur trade advising them of the number of pelts to be sold, the time, and place of sale. The furs are sold to the highest bidder for cash.

In the past three years the Department has had to sell the furs at ceiling prices. In order to give each fur dealer a fair chance at purchasing a lot of furs, the names of all licensed dealers present at the sale are put into a large box and their names are drawn for the various lots of fur. The first name drawn gets Lot. No. 1, the second, Lot. No. 2, the third, Lot. No. 3, etc., and these dealers pay ceiling prices for the furs.

After the sale, complete information is forwarded to the New Orleans office where tabulations are made and bills prepared for the trappers' portion of the furs sold. The trapper receives 65% and the Department 35%.

On the following page is a report of the revenues received from the sale of furs and the number of animals taken from Marsh Island, State Wildlife Refuge and the Rockefeller Refuge from the 1940-1941 season through the 1944-1945 season.

REVENUES RECEIVED FROM THE SALE OF FURS AND NUMBER OF ANIMALS TAKEN FROM THE STATE GAME REFUGES—MARSH ISLAND—STATE WILDLIFE—ROCKEFELLER REFUGE.

Season	Muskrats	Mice	Mink	Raccoon	Otter	Miscl.	Revenue	Dept.'s 35 %	Trapper's 65%
MARSH ISLAND									
1940-41	219,828	8,222	1,329	1,827	15	5	$ 275,593.25	$ 96,457.90	$ 179,135.35
1941-42	282,257	15,845	905	1,172	10	......	315,382.73	110,384 25	204,998.48
1942-43	173,166	12,180	589	811	8	......	237,796.12	83,228.63	154,567.49
1943-44	133,649	5,914	605	1,073	35	......	197,942.53	69,279.88	128,662.65
1945-45	110,967	4,953	536	1,100	14	8	137,944.19	48,280.52	89,663.67
	919,867	47,114	3,964	5,983	82	13	$ 1,164,658.82	$ 407,631.18	$ 757,027.64
ROCKEFELLER REFUGE									
1940-41	102	....	207	729	......	......	$ 1,747.11	$ 611.17	$ 1,135.94
1941-42	17,355	959	442	658	1	......	22,269.23	7,794.25	14,474.98
1942-43	38,786	3,211	696	919	4	......	56,439.73	19,753.99	36,685.74
1943-44	63,844	2,884	966	1,266	6	......	98,106 79	34,337.38	63,769.41
1944-45	35,330	2,110	375	1,280	4	2	45,570.05	15,949.58	29,620.47
	155,417	9,164	2,686	4,852	15	2	$ 224,132.91	$ 78,446.37	$ 145,686.54
STATE WILDLIFE REFUGE									
1940-41	25,882	1,128	268	129	1	......	$ 34,176.73	$ 11,961.89	$ 22,214.84
1941-42	38,248	2,077	230	176	3	......	41,864.00	14,652.36	27,211.64
1942-43	44,874	1,770	219	172	3	......	62,250.19	21,787.62	40,452.57
1943-44	56,521	1,612	215	340	1	......	83,243.09	29,135.08	54,108.01
1944-45	47,370	1,800	120	212	3	4	57,844.74	20,245.71	37,599.03
	212,895	8,387	1,052	1,029	11	4	$ 279,378.75	$ 97,782.66	$ 181,596.09
RECAPITULATION									
	1,288,179	64,665	7,702	11,864	108	19	$ 1,668,170.48	$ 583,860.21	$ 1,084,310.27

DIVISION OF OYSTERS AND WATER BOTTOMS

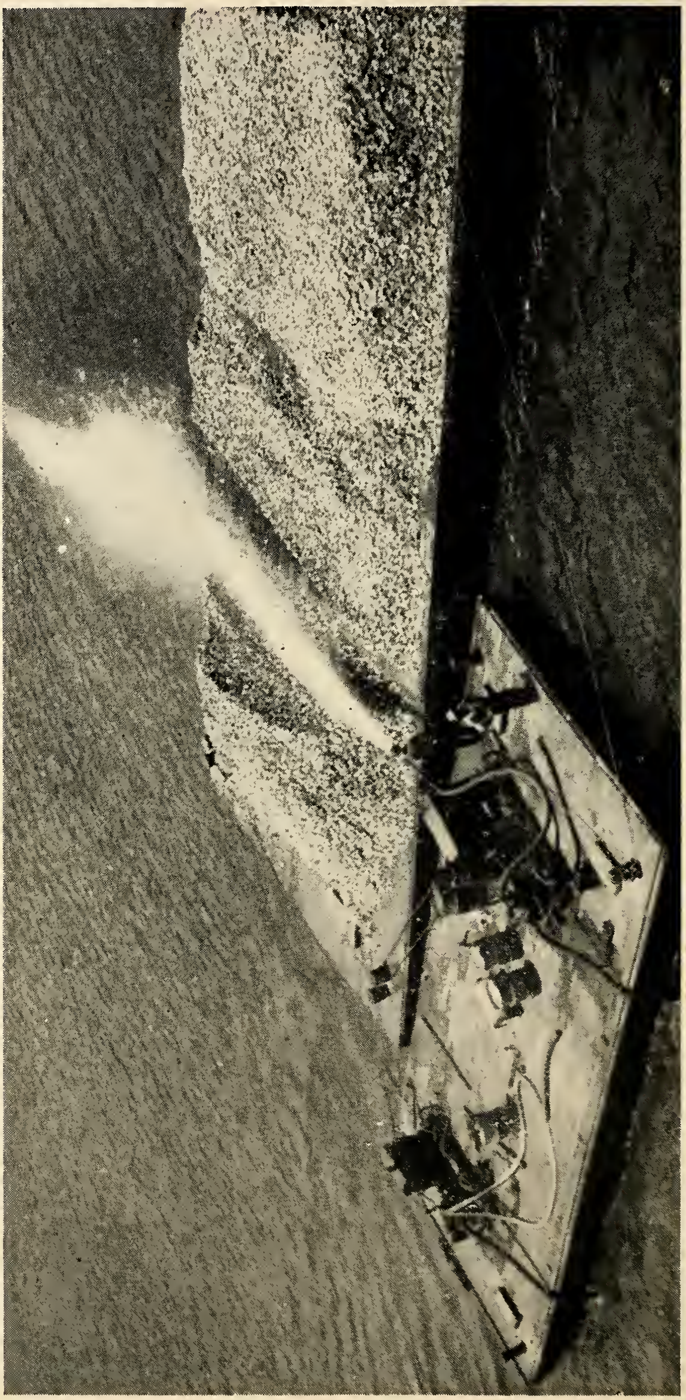
JAMES N. MCCONNELL, *Director*

McCONNELL

The passage of Act No. 227 of 1944 has opened possibilities for future oyster production in Louisiana unparalelled by any other state in the Union. In the opinion of the Director, which is concurred in by some of the foremost oyster experts in this country, Louisiana has only scratched the surface of its possible oyster productivity, utilizing at present less than 10 per cent of its available oyster area. The purpose of this report is to show what is being done with monies appropriated by the Legislature and also to indicate what is being planned for the future. These plans will be subject to change due to weather and overflow conditions.

COUNTER AND RAW SHOP CONDITIONS EXISTING IN LOUISIANA AT THIS TIME

A tremendous demand for oysters, in conjunction with a great scarcity of labor for the past two winters, has resulted in a lowered standard as to quality as well as a considerable shortage in quantity of the famous Louisiana counter oyster. Thus a vicious circle is started. The dealers' need for oysters is so great that they will accept any quality brought to market. The fishermen knowing this, bring in unculled and in many instances very small oysters. The dealer will not refuse any oysters brought him as he well knows that some other dealer will accept them and that he will eventually be forced out of business, as the demand for oysters has been far greater than the supply during the past two years. The average fisherman before the war was being paid approximately $90.00 a month plus his food, lodging and tobacco, the good oysters at that time selling from $0.75 to $1.00 a sack on the reef. Today, the same fisherman obtains for his services from $225.00



In 1945, 92,424 barrels of oyster shells were bedded as cultch by modern hydraulic methods.

to $300.00 a month plus his food, lodging and tobacco. Oysters on the reef are at this time selling for $2.00 to $2.50 per sack.

PRESENT CONDITIONS IN THE STEAM CANNING INDUSTRY

Heavy losses of oysters on the natural reefs have resulted from an excess of fresh water coming from the Mississippi River over the Bohemia Spillway in 1944, as well as from the opening of the Bonnet Carre Spillway in 1945. So many oysters were killed that due to these conditions a short pack of steamed oysters was available for the 1944-45 canning season, and a very light pack can be expected again this year.

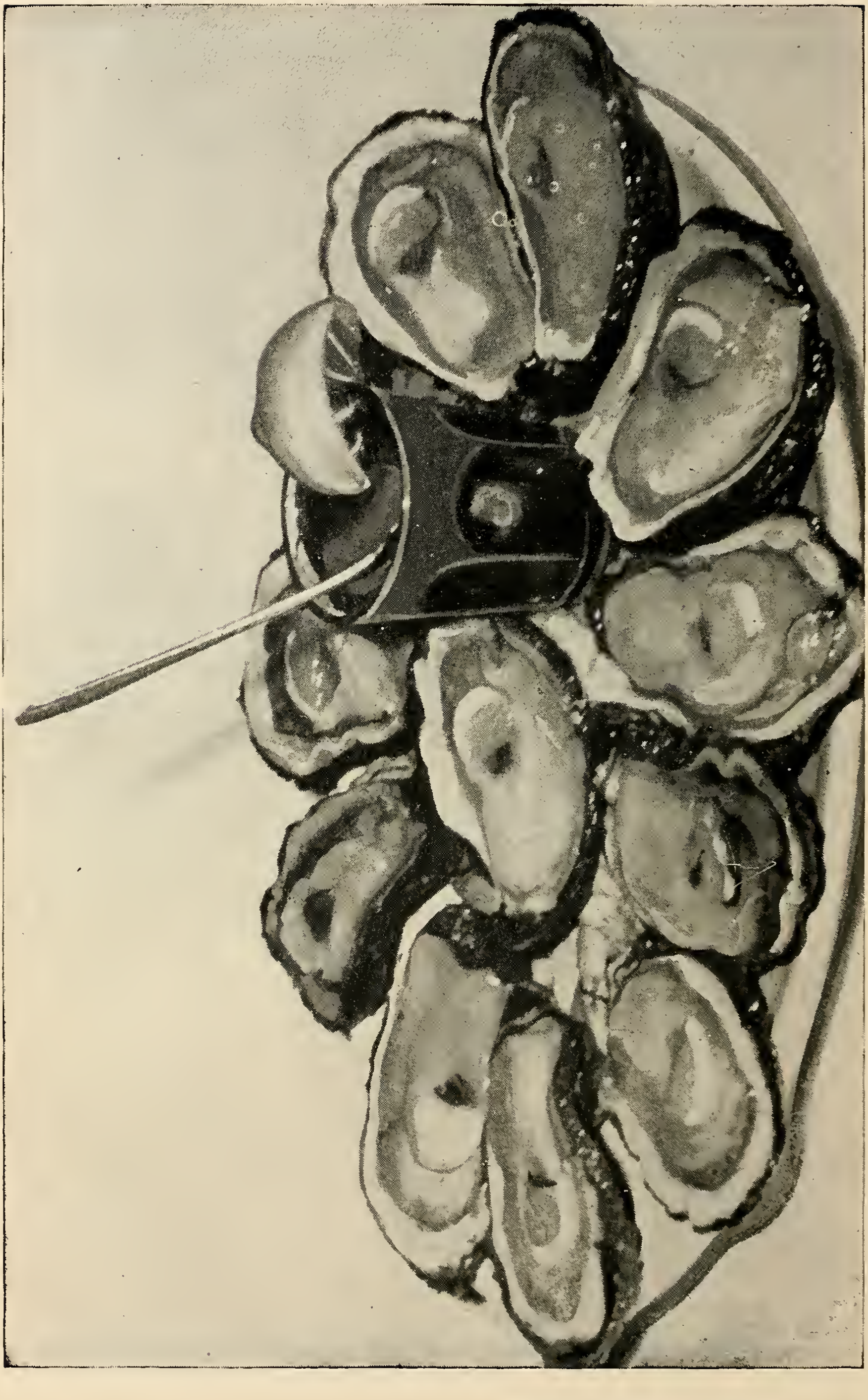
In addition to the shortage of oysters, all of the packing plants for the last two years have suffered heavily from the scarcity of labor, particularly the scarcity of oyster shuckers. Many plants that formerly shucked as many as 1,500 barrels daily were unable to obtain sufficient shuckers, thereby decreasing the output to from 350 to 500 barrels.

FUTURE OUTLOOK

From information gathered from several recent inspections, the winter of 1946-47 should furnish the largest crop in Louisiana history, provided no excess flood water this spring should again kill the young crop which has now attached itself to the oyster shells remaining from the lost crops of the past seasons.

HEAVY MORTALITY DUE TO OPENING OF BONNET CARRE SPILLWAY

Just after the Bonnet Carre Spillway was closed in the spring of 1945, a careful survey was made by the Commissioner of Wild Life and Fisheries, the Director of Oysters and Water Bottoms, the Chief Biologist of the Department, and the Aquatic Biologist in charge of the Federal Fisheries Biological Laboratory in Pensacola, Florida, to determine the amount of damage done to the natural reefs of St. Bernard Parish caused by the opening of the Spillway. Investigation of this entire area disclosed a total loss not



only on State-owned natural reefs but also on leased bedding grounds of a number of fishermen located in the various sections of the northeastern part of St. Bernard Parish. The live oysters on the natural reefs in Mississippi west of Pass Christian were also killed. House Bill No. 3888, introduced by Mr. Colmer of Mississippi, is asking the Federal Government to reimburse the states of Mississippi and Louisiana in a sum not to exceed $3,000,000.00. This will also afford relief to those private lease holders who have lost their entire oyster crop due to the opening of the Spillway.

A survey was also made of losses occurring in the Lake Mechant and Deer Bayou section of Terrebonne Parish. The fishermen in this parish claim that additional fresh water was diverted to this area by the construction of a dam in Bayou Teche for the protection of Franklin, Louisiana, and vicinity, thereby killing the oysters in these parts. It is our understanding that the entire congressional

Loading oysters from small dredge to mother boat.

Fleet of boats at site of dynamite-oyster experiments. The "Ostrea" (oyster research boat), the "Louisiana" (oyster boat), and the "Muskrat" (fur coat), all three of the fleet of the Department of Wild Life and Fisheries. At the right is the dynamite boat "Eagle Pass" of the Gulf Oil Corporation.

delegation of the states of Mississippi and Louisiana is doing everything in its power to obtain adequate compensation for the heavy losses incurred by these states.

SHELL PLANTING

During the summer of 1944, 58,607 barrels of shells were bedded west of the Mississippi River; 29,185 barrels in Sister Lake (State Seed Oyster Reservation) in Terrebonne Parish, and 29,022 barrels in Lake Felicity in Terrebonne Parish near the border of Lafourche Parish,

James N. McConnell, Director of the Division of Oysters and Water Bottoms, tonging oysters in dynamite experiments. Shotline in background.

the contract price being 37 cents per barrel, making a total cost of $21,536.59. About 250 barrels were planted to the acre and approximately 235 acres were planted.

During the summer of 1945, 51,459 barrels were bedded west of the River as follows: Bay du Chene in Jefferson Parish, 15,251 barrels; Lake Tambour in Terrebonne Parish, 16,383 barrels; and Sister Lake, 19,825 barrels. At the contract price of 36 cents per barrel, the total expenditure amounted to $18,525.24. About 250 barrels were planted to the acre and approximately 206 acres were planted. These bedding grounds were posted and two watchmen were employed to patrol the areas. A speedboat was provided each watchman so that the seed grounds could be properly patrolled and posted signs maintained.

Measuring and sacking oysters.

Fishermen must secure permits to obtain seed oysters from these bedding grounds for transplanting to their own bedding grounds.

During the spring of 1945, 40,965 barrels, at 44 cents per barrel, were planted as cultch east of the Mississippi River in Bay Boudreaux in St. Bernard Parish, at a total cost of $18,024.60.

During the spring of 1945, a project was carried out to scarify dead shell reefs in St. Bernard and Plaquemines Parishes, in order to take advantage of the fresh water condition existing at that time to rehabilitate those reefs with a large catch of young spat. This was done at a cost of $8,919.00.

PURCHASE OF LEASES

Proceeding under the authority of Act 227 of 1944, authorizing the acquisition for the State of Louisiana of existing oyster water bottom leases found within the limits of areas designated by the Department of Wild Life and Fisheries as Oyster Seed Ground Reservations, and to pay for the surrender of such leases, including all oysters, seed oysters or other improvements found on such private leases, out of the funds and revenues placed at the disposal of the Department through this Division, we purchased from Mr. Theo Engeron forty (40) acres in Sister Lake, his Lease No. 8792, for $4,000.00.

We then began to negotiate with Mr. Ludwig Doucet to purchase beds which he owned, Lease No. 8634-A, eighteen (18) acres in Sister Lake, together with Lease No. 8291, sixteen (16) acres in Sister Lake, owned by Mr. Doucet and Mr. Hypolite Eymard, which two leases were purchased at a total cost of $7,000.00.

Negotiations are just being completed for the purchase of Lease No. 8671 covering four (4) acres situated in Sister Lake from Messrs. John Pitre and Hennessy Autin for a total consideration of $400.00.

We are now negotiating with Mr. Engeron for an additional seven (7) acres under Lease No. 8544 which will give the State the entire area of Sister Lake for the State Seed Oyster Reservation.

Included in the purchase of Lease No. 8792 was a camp located on the south side of Sister Lake near Bayou du Large measuring 100 x 100 feet. The land where this camp is located is owned by the Lousiana Land Company from whom we have secured a twenty-six-year lease. Considerable improvements to this camp are contemplated which include watchman's quarters and space for a biological laboratory. Wharves and boat houses will also be constructed.

COLLECTIONS

Most companies handling oysters turn their reports in regularly and within the time limits prescribed in the

One of the fleet of five experimental boats with exploration officials and crew members. Some experimental live cars are shown in foreground.

law in order to avoid the payment of penalties. There are still a few who send their reports in several at a time but as all penalties are collected, additional sums are collected which amount to quite a bit of extra money during the year. Mistakes and discrepancies in amounts reported are picked up from time to time when audits are made.

REPORT ON COLLECTIONS
(Fiscal Year)

	1943-44	1944-45
Bedding Ground Rental	$ 18,159.50	$ 19,767.00
Privilege Tax	18,741.71	23,512.49
Tonnage License	1,629.00	1,499.00
Dredging License	7,600.00	6,800.00
Shop, Steambox and Resale	1,685.00	1,730.00
Transfer of Leases	28.00	43.00
	$ 47,843.21	$ 53,351.49
Sand	1,215.98	660.29
Shells	93,005.99	*13,511.21
Gravel	3.52	15.11
	$142,068.70	$ 67,538.10
Shell collections under Act 227		66,580.27
Grand Total of Collections	$142,068.70	$134,118.37

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* Collections made before passage of Act 227 of 1944 dedicating these funds to the establishment of oyster seed grounds and to the planning, propagation, cultivation, policing, preservation and distribution of oysters.

REPORT ON PRODUCTION
(Calendar Year)

Total barrels of oysters taken from Louisiana waters:

	Barrels	
	1944	1945
St. Bernard	299,664.75	197,858.50
Terrebonne	85,384.83	106,018.59
Plaquemines	181,679.67	275,681.50
Jefferson	49,713.00	34,710.50
Lafourche	17,860.00	14,160.50
Total	634,302.25	628,429.59

Total cubic yards—sand, shells and gravel:

	Cubic Yards	
	1944	1945
Sand	49,899.54	55,973.93
Oyster Shells	1,085,689.60	976,476.93
Clam Shells	544,366.09	652,122.28
Mixed Gravel	223.00	48.00
Total	1,680,178.23	1,684,621.14

REPORT OF ACTIVITIES RELATED TO OYSTER PROBLEMS

By JAMES NELSON GOWANLOCH,
Chief Biologist, Division of Fish and Game

(A report covering other activities of the Chief Biologist will be found in the report of the Director, Division of Fish and Game, Department of Wild Life and Fisheries, on page 61.)

Scientific problems, some biological, some chemical and physical, in character that are of completely critical importance for the Louisiana oyster industry have arisen during the biennium here reported and their investigation has involved careful planning, conduct and completion of technical experiments designed to provide the facts, hitherto unavailable anywhere, that could be used to protect our State oyster interests. The experiments were planned and conducted by the writer in collaboration with various other scientists of the State of Louisiana.

Additionally the results of earlier scientific investigations conducted by the writer culminated in a decision of the Supreme Court of Louisiana that not only attracted international attention but established for the first time a protection for oyster growers operating on waterbottoms rented from the State where their rights were jeopardized by the activities of oil companies operating under oil development rights granted by the same agency (the then Department of Conservation of the State).

EFFECTS OF UNDERWATER DYNAMITE EXPLOSIONS ON OYSTERS

The following report covers the extension of these experimental studies of the biological effects of underwater dynamite explosions on oysters.

These experiments were devised and performed under the Commissioner and at the request of James N. McConnell, head of the Division of Oysters and Water Bottoms. Director McConnell personally participated in the carrying out of the specific oyster series of studies.

This work was planned, executed and reported by the writer and John E. McDougall, former Departmental Geophysicist, Division of Oysters and Water Bottoms, Louisiana Department of Wild Life and Fisheries. The following account, which was prepared by both, should be read as an extension of the report on the studies of the effects of underwater dynamite explosions on shrimp and fish. That report will be found in the section of the report by the Chief Biologist contained in the report of the Director, Fish and Game Division, Louisiana Department of Wild Life and Fisheries, in this Biennial.

However, the senior investigator, for biological reasons, was skeptical that the effects of the explosion-originated waves would be the same on single oysters suspended in cages as they would be upon oysters which were not separated individuals but were integrated as part of a compact oyster reef. It was accordingly decided to plan and execute a complete series of investigations of the results of such explosion wave impact upon oyster beds.

The first difficult problem was to locate suitable experimental areas. The requirements were exacting. It was necessary that areas of sufficient extent be found wherein healthy, rapidly growing oysters were present in sufficient numbers and the grounds themselves were neither under private lease nor were being presently publicly fished.

Consideration and examination of many parts of the Louisiana coastline extending from as far east as the Mississippi border and as far west as the western end of Marsh Island were undertaken. The area finally chosen comprised three "lakes" near Lake Eugenie.

The Gulf Oil Corporation, through their Research and Exploration Division, gave invaluable cooperation to these oyster-dynamite studies by transferring a complete drilling, loading and firing crew, and dynamite boat "Eagle Pass" to the scene of operations. The investigators are indebted to the following members of the Gulf Oil Corporation for their aid in these experiments, Messrs. W. J. Osterhoudt, W. B. Lee, and F. Bailey Summers. Particular mention should be made of the indispensable aid given by Mr. W. B. Wiley, party manager, who directed his efficient crew consisting of Messrs. A. F. Krause, J. B. Bowman, O. L. Patterson, L. J. Broussard and Noah Curole. They carried out expertly all the seismographic work requested of them. Efficient cooperation and aid were also extended by Messrs. R. McClue Schmidt, Albert D. Harvey and Felix Mire of the United States Engineers Office, New Orleans District.

Adverse weather conditions greatly hampered and delayed the work but without exception every projected experiment in the series was completed.

The oyster-dynamite series of experiments were conducted as follows:

A careful preliminary survey revealed that the oysters present, although not "fat", were healthy, growing rapidly, and present in sufficient abundance and extent to provide material so that the six different shots fired could be spaced without possible interference with each other or possible accumulative effect. Preliminary counts were made to determine the normal mortality among the oysters present. Immediately before the blasting, samples of the oysters were carefully tonged and sacked. These thus provided a "control"

Immediately after the shot, similar adequate samples of the oysters were tonged at regular radial distances from the shot point, sacked, and transferred together with the "controls" to the U. S. Fisheries Station at Pensacola.

The director of the Station, Dr. A. E. Hopkins, one of the most eminent oyster authorities in the world, very kindly provided facilities so that these oysters could be held in four large tanks with an adequate change of pure sea water. These tanks had for years previously been used for oyster studies and the conditions created in them were thus proven to be quite satisfactory for oyster survival and growth.

One of the boats used in the oyster research and experiments, and to the right, a charge of dynamite being exploded.

These oysters held at Pensacola could thus be depended upon to show what effect, if any, the dynamite shock wave alone had upon them. They were examined over an initial period of some days and then kept under subsequent examination until six weeks had lapsed, when final counts were made to provide comparisons in death rate between all the groups studied.

It had been the belief of the fishermen that the release of gases or possibly other substances from the mud in the oyster bed might be a factor. Therefore, subsequent examinations were made directly on the experimental sites to determine if any significant death rate occurred among the oysters left on the reef after the blast.

The results of these exhaustive experiments may be very briefly summarized.

The explosion of charges of up to 400 pounds, where the top sticks of dynamite were only 25 feet below the oyster bed, failed to cause mortality in that oyster bed. There can be no doubt whatever about the validity of these conclusions since as has already been indicated careful observations were made of oysters removed at the time of the explosions and also of oysters remaining in the area.

The interpretation of the actual progress and dissipation of the shock waves must be made at a later date but it should suffice here to say that all of these experiments fall very well into a complete pattern ranging from the use of depth charges, the effects of heavy artillery fire, the effects of heavy bombing, and the most recent of all explosives, the effects of atomic bombing.

It is, therefore, on this basis of careful experimental work that we can now conclude that seismographic exploration of oil can be carried out adequately without harming our valuable aquatic resources. This is not a matter of surmise and not a matter of wishful thinking, but is a matter of carefully planned experiments adequately controlled and providing these revealing valuable results.

TECHNICAL EVIDENCE SUPPLIED OYSTER MEN IN OIL POLLUTION CASE

Results of over a year of investigation conducted by the writer relating to the effects of oil pollution on oysters came to a conclusion in a decision of the Supreme Court of Louisiana during this biennium, although the work was performed 12 years ago.

It was contended by the oyster men that activities in an oil field that had been developed in an oyster producing area had caused exceptional mortality in the oyster crop. The Chief Biologist planned and executed researches designed to analyze the effects on oysters of sea water that had come in contact with oil or that had come in contact with oil polluted muds. Four series of these experiments were completed extending over a period of a year, together with many other related field and laboratory studies. These investigations were completely impartial and were performed simply to ascertain pertinent facts. Nineteen suits were filed by oyster producers against the oil company concerned and one of these suits was tried as a test case. Related investigations were also subsequently made by biologists of the Federal government.

The litigation remained in the lower court for a period of over 10 years when an adverse decision, stating that no grounds for action existed, was rendered.

The case was then appealed to the Supreme Court of Louisiana and by this decision, based largely upon the evidence presented by the Chief Biologist, the Supreme Court reversed the finding of the lower court and granted full damages to the plaintiff.

As result of this decision the other cases were settled out of court involving the payment of over $211,000.00 to the oyster men. This decision attracted international attention since it established a clear precedent for the protection of the rights of oyster men where both the authority to grow oysters and the authority to produce oil had been granted by the state to the contending litigants.

CRITICAL SCIENTIFIC STUDIES ON OYSTERS USED FOR CANNING

A second series of problems critically affecting the oyster industry of Louisiana arose when the Federal Food and Drugs Administration instituted libels against certain Louisiana canned oysters shipped in interstate commerce. One of these legal actions was instituted by the Federal agency while the oysters were in transit in Georgia. Since this and other similar cases involved a total of $125,000.00 worth of Louisiana canned oysters, the problem was a serious one.

Some of the producers were far from convinced that the organoleptic tests used in condemning the oysters as unfit for food were sufficient. The trial of the initial case resulted in a judgment against the defendant. Trial on appeal before the Federal Court of Appeals resulted in the reversal of the decision. A further appeal to the State Supreme Court of Georgia resulted in a second reversal and a decision against the defendant. Since the organleptic test involves simply the smelling of the open can of processed oysters it seemed highly desirable that scientific studies be undertaken to establish some accurate reproducible test of a chemical nature, the use of which would serve both as protection for the consumer in maintaining proper standards and as protection for the packer in giving an accurate index of the condition of the oysters. Dr. David E. Brown, President of the Louisiana State Department of Health, requested Major John G. Appel, Commissioner of the Louisiana State Department of Wild Life and Fisheries, that the writer cooperate in the planning and execution of adequate scientific studies that would establish a sound basis for the determination of the condition of canned oysters and of oysters used for canning. James N. McConnell, Director of the Division of Oysters and Water Bottoms, immediately instructed that these investigations be undertaken and authorized the necessary expenditures of funds from and use of facilities of this Division to execute these studies. This work was performed by the writer in cooperation with William Hughes King, Chief, Chemical-Toxicological Section, and F. F. Flynn, Chemist, State Department of Health. The scientific results were published in a technical report entitled "Experimental Studies on Decomposition of Oysters Used for Canning" published in the Journal of the Association of Official Agricultural Chemists, Volume 28, May, 1945, pages 385-398.

This research program was begun in September 1944.

The writer together with William H. King, Chief, Chemical-Toxicological Section, and Frank F. Flynn, Division of Laboratories, Louisiana State Department of Health, carefully planned, carefully executed, and carefully analyzed the results of researches designed to reveal the value of the concentration of indole, as an index of the degree of decomposition of oysters to be used in canning. The organoleptic referred to above is simply a test by smell or in other words a decision based upon "sniffing" the questioned commodity. It was the object of these studies to replace this irreproducible (in high measure) subjective test by a precise technical method that would eliminate the human equation.

It is necessary to understand these experiments and results to realize that the indole tests had fallen into discredit because of inability to reproduce results.

The instruments used in this work is a Beckman Quartz Spectrophotometer by the use of which it is possible to reproduce measurements of weights, of substances in quantities as small as two one-billionths of a pound.

Oysters were held for varying periods of time and were experimently canned in exactly ascertained ratios, of good and bad oysters, ranging from 100% fresh to 100% "rotten". These oysters were subjected to critical chemical analysis.

To the surprise of the investigators the results revealed that indole is the valuable index of the degree of oyster decomposition, and, in spite of textbook statements to the contrary, is actually, in its pure state, an odorless substance.

These experiments established that the undependability existing hitherto in indole calculations as an index of decomposition resulted from imperfect techniques which did not discriminate between indole per se and certain still unidentified substances which are evidently of no significance in such determinations.

Formerly all judgment regarding fitness of canned oysters has been based on the organoleptic or "sniff" test. After a bad oyster is steamed open, washed, soaked and processed in the can, it is difficult to detect by odor. Furthermore, it was contended that the residual odor of oyster reef mud gave a false impression of unfitness of canned oysters.

The extensive experimental work conducted resulted in establishing a procedure which will detect and accurately measure as little as two billionths of a pound of indole—a chemical product of decomposition of animal matter. The research disclosed that fresh oysters contain none of this material whereas oysters allowed to die and spoil in the shell always contain measurable quantities.

The method involves isolation of the indole by steam distillation of the oysters. This is followed by extraction with immiscible solvents and development of a red color with Erlich's aldehyde. The intensity of this red color is measured in a spectrophotometer, using monochromatic light having a wave length of 560 millimicrons. The intensity is then correlated with the intensity of the same color developed from pure indole.

While the published reports refer only to the application of the method to oysters subsequent experimental work shows that it can be applied to shrimp and crabs and other seafoods. Undoubtedly it will also find usefulness, later, in determination of decomposition in many other food products.

Although the basic idea is not new, all previous efforts by other scientists to apply similar procedures to food products had invariably failed because of flaws in the analytical procedures followed. Careful experimentation by the authors eliminated these flaws and led to development of the present method which will undoubtedly be used as a stepping stone to future scientific procedures for determining decomposition in a wide variety of foods.

The large majority of canned oysters are of excellent quality. The need for the above scientific development is principally for the food processors and packers to check up on their own product to avoid accidental contamination and for regulatory officials to check up on the packers to control any who may get out of line.

This work has attracted international attention as indicated by the extensive technical reviews of it in various journals, the reprinting of its basic data in food journals and in the very numerous requests for copies of the definitive scientific report, from many parts of the United States and many foreign lands.

OYSTER DRAINAGE STUDIES

A situation so full of possible disaster that it would overnight, completely wipe out Louisiana's participation in interstate commerce in raw shucked oysters, arose last summer when the Federal Food and Drugs Administration, after holding a preliminary hearing, tentatively proposed the setting up of definitions for raw shucked oysters entering into interstate commerce. The important element in these proposed regulations was the projected tolerance for "fully drained oysters" of 3 per cent by volume of what can best be termed "free oyster liquor".

At the request of James N. McConnell, director, Division of Oysters and Water Bottoms, the writer, together with William H. King, Chief, Chemical-Toxicological Section, Louisiana State Department of Health, assisted by E. F. Lindsey of the Oysters and Water Bottoms Division, Louisiana Department of Wild Life and Fisheries, and E. F. Flynn in the State Health Department laboratory, and J. W. Forbes, Chief, Food and Drug Section of the State Department of Health, planned and executed a comprehensive series of critical experiments to determine the free liquor content and "bleeding" characteristics of shucked Louisiana oysters, handled under various conditions after shucking. Director James N. McConnell made available the necessary funds from the Division of Oysters and Water Bottoms for expenses incurred in the conduct of these researches.

Conducted during August, September and December, 1945 and during January, 1946, these experiments involved the handling and analysis by various quantitative weighing and qualitative and quantitative methods of chemical analysis of in excess of 25 thousand oysters.

These data, completely pioneer with respect to their precision in measuring and experimental procedure timing of such quantities of oysters, resulted in the preparation of a 21-page mimeographed report entitled: "Experimental Studies of Louisiana Raw Shucked Oysters Especially with Reference to their 'Bleeding' Characteristics" by James Nelson Gowanloch, Chief Biologist, Louisiana Department of Wild Life and Fisheries, and W. H. King, Chief, Chemical-Toxicological Section, Louisiana State Health Department.

The Food and Drugs Administration called a further hearing in Washington, January 15 through 18 inclusive, 1946.

When at the preliminary meeting of the directors of the Oyster Institute of North America, in response to the request of James N. McConnell, to whom the Oyster Institute of North America had delegated the entire responsibility for the presentation of the case for the Gulf States, the writer presented in summary the data of these Louisiana experiments, the Oyster Institute immediately and unanimously decided to ask the Louisiana delegation to lead off all the technical testimony and further decided to build their whole defense around the Louisiana report. Louisiana witnesses occupied, by request, a very large proportion of the time of the whole taking of evidence and in no instance was Louisiana denied admission of any of its testimony or of any of its exhibits. Although the usual official time for the filing of exhibits and counter testimony is being allowed, it was made quite clear, on the witness stand, by the chemist representing the Food and Drugs Administration that the promulgation of a 3 per cent permissible drainage for Louisiana Oysters was not practically possible.

James N. McConnell and James Nelson Gowanloch of the Department of Wild Life and Fisheries and William

H. King and J. W. Forbes of the State Department of Health were witnesses for Louisiana at the hearing. The Oyster Institute of North America in its subsequently issued bulletin very graciously stated "top honors should go to the four state officials of Louisiana."

The writer in collaboration with the rest of the Louisiana delegation is preparing certain additional statements and counter testimony which will be filed with the Federal Food and Drugs Administration, and will thus become incorporated in the final official record.

The Honorable James Domengeaux, a member of the committee on the Merchant Marine and Fisheries of the House of Representatives, was extremely helpful in providing advice and assistance in the presentation of Louisiana's case.

FEDERAL FOOD AND DRUGS HEARING

The purpose of this brief statement is to present certain fundamental facts that indicate the reasonably realiz-

James Nelson Gowanloch, Chief Biologist of the Department, has completed several internationally recognized experiments on oysters for the Division of Oysters and Water Bottoms during the last biennium.

able future of the development of commercial oyster production in the Louisiana coastal areas. The pertinent significance of this potential expansion is that it makes increasingly important Louisiana's continued part in interstate commerce in raw shucked oysters. Such development must involve, and in large measure depend upon, such essential out-of-state outlets for increased production.

Therefore, although at first glance the testimony here presented may seem extraneous to the establishment of drainage standards, nevertheless, the establishment of standards that might for reasons of regional differences in the basic characteristics of gulf oysters (if such differences do exist) or in regional differences in recognized plant procedures (which, although fully meeting sanitary standards might, nevertheless, result in a differential in "drainage" behavior of the shucked oyster production) these data have a direct importance in the structure and justice of the establishment of such standards.

A survey was conducted by members of the Department including James McConnell, E. F. Lindsey and the writer, which indicated that a total of 20 Louisiana oyster packing houses an average of 54% of their production now enters interstate commerce.

Although these 20 establishments do not present the full coverage of the raw shucked oyster industry in Louisiana (the industry is not as completely organized as the oyster industry of New England) it does definitely represent a significantly characteristic picture.

BIOLOGICAL FACTORS THAT CREATE ESPECIALLY FAVORABLE CONDITIONS FOR OYSTER CULTURE AND THE EXPANSION OF THE OYSTER INDUSTRY IN THE COASTAL AREAS OF LOUISIANA

It is not the objective here to present a dissertation on the life history of the oyster, but merely to indicate some of the many reasons why the Louisiana coastal areas are exceptionally favored for increased oyster production. These are all bound in primarily with the Mississippi river flow relationship.

1. Oysters depend for their food supply upon microscopic organisms (chiefly minute plants known as diatoms) which in turn depend for their productivity upon the presence of certain chemicals among which are phosphates, nitrates, and nitrites. When these substances are exhausted in the water levels to which light can effectively penetrate the limit of production of diatoms and certain related organisms is reached. Increase in their productivity, therefore, depends upon the addition of these substances from some source, in this instance the contribution of the Mississippi river.

Careful studies have revealed quantitatively the distribution and significance of these substances brought into the Louisiana coastal waters by the Mississippi River runoff. (The chemical data are derived from Gordon A. Riley, "The Significance of the Mississippi River Drainage for Biological Conditions in the Northern Gulf of Mexico". Sears. Found. Jour. Mar. Res., Vol. I, No. 1, pp. 60-74. 1937. This appears as number 150 of the Collected Reprints of the Woods Hole Oceanographic Institution, Volume I, 1937.) These researches have revealed that in the Gulf of Mexico itself the soluble phosphorous ranges from 2 to 8 milligrams per cubic meter, with an average of 3.8, while in the mouth of the Mississippi river near Southwest Pass and Pass-a-Loutre 16 milligrams per cubic meter is the value obtained. This zone of high phosphate content is quiet superficial.

Cholorphyll can be used (with certain modifications) as a measure of the productivity of water in terms of available food for oysters. This value is expressed in practice as arbitrary Harvey units, one unit corresponding to approximately .88 gamma of cholorphyll. Because of many variables these gamma cannot be converted directly into absolute weights of phytoplankton (which includes the minute plants, for example diatoms, upon which oysters feed) but they do serve as an index of potential photosynthetic activity. This index is more useful in studying productivity than general plankton weights, which, objectionably, include measures of various animals, bacteria and detritus, as well as of microscopic green plants.

The average amount of cholorphyll in Gulf of Mexico analyses was 6.7 Harvey units per liter. Around the mouth of the Mississippi river an area reaching about 8 units per liter exists. The completely fresh water of the Mississippi river (taken at New Orleans) showed a value of 12.8 units.

2. Copper is a critical factor in the success of the "setting" of oyster larvae as "spat". In the absence of a certain quantitative threshold, oyster larvae no matter how otherwise healthy and vigorous are incapable of becoming attached to available surfaces and cannot continue their development. The data indicate that the amount of copper in the Gulf of Mexico near the entrance of the water of the Mississippi river is relatively large. The range extends from 1 to 15 milligrams of copper per cubic meter with the highest values in water of low salinity. Examination reveals that the highest values, for instance, 15 milligrams per cubic meter, occur near the entrance of the Mississippi river water, the value falling to 10 milligrams per cubic meter along the coastal areas and to 5 milligrams per cubic meter farther off shore.

3. The contribution of silt by the Mississippi river is enormous. The contribution of sediment to the Lower Delta is on the average at least two million tons every 24 hours. This acts directly as a factor inhibitating the presence of starfish that in other areas are serious and economically extremely destructive oyster enemies. Whereas the activities of starfish of the genus *Asterias* cause annual losses amounting to hundreds of thousands of dollars in areas where they occur, no starfish capable of injuring oysters is able to live in the presence of the silt contribution of the Mississippi river and, therefore, these Echinoderms do not enter into the oyster production picture. This alone is an important economic element in the Louisiana oyster production pattern.

4. The climatic conditions permit uniform efficiency in the working of the oyster beds throughout the entire year and provide thus an additional very considerable advantage in oyster operations.

The location of Louisiana oyster growing areas in relation to population and industrial pollution is such that the problems of contamination of oyster beds, serious in many other parts of the country, are reduced to a minimum or are absent. This is strikingly advantageous as is revealed when any comparison is made between Louisiana areas with areas elsewhere of equivalent oyster productivity and importance.

The purpose of offering these data is to support the contention that Louisiana is capable of vast expansion in its production of oysters. If the Federal Food and Drugs Administration promulgate and enforce draining regulations which Louisiana oysters are not capable of meeting, the entire State of Louisiana's raw shucked oyster industry, dependent in great part as it must be on participation in interstate commerce, will be jeopardized.

OYSTER LOSS STUDIED

The writer participated, together with the Commissioner, Major John C. Appel, James N. McConnell, Director of the Division of Oysters and Water Bottoms, and Dr. E. A. Hopkins, U. S. Fishery Laboratory, Pensacola, Florida, in a survey of the damage to public and also privately leased-oyster areas in Louisiana, which damage resulted from the necessary opening of the Bonnet Carre spillway from March 24 to May 17, 1945. The writer, by request, also cooperated with the Mississippi Sea Foods Commission as a member of a scientific group, including James N. McConnell, Director of Oysters and Water Bottoms, and Dr. E. A. Hopkins, U. S. Fishery Laboratory, Pensacola, Florida, in a survey of the disastrous and complete damage effected by the Bonnet Carre spillway fresh water on the oyster resources of the State of Mississippi.

SUGGESTS JAPANESE OYSTERS BE PROHIBITED

The writer believes that it would serve a good purpose if legislation be secured forbidding the introduction by anyone of Japanese oysters into Louisiana waters without specific written authorization by the Commissioner of the Louisiana Department of Wild Life and Fisheries. Such a prohibitory act has been recently introduced in the State of Rhode Island.

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LEGISLATIVE RECOMMENDATIONS

Act No. 108 of 1944 appropriated $100,000.00 for new locks at Empire, Louisiana. After due advertising two bids were received for new locks at this location in the following amounts: $481,865.00 and $349,995.00.

Since there was not enough money available to do this work, it was finally decided to re-advertise for half of the locks to be built at this time. The new bid for half the locks amounted to $117,107.50. Work has been started and should be completed within six months. It is absolutely essential that the Legislature appropriate enough money to complete these locks.

The locks at Ostrica are in very poor condition and should be rebuilt. It is recommended that money be appropriated for this project as the traffic through these locks amounts to approximately 2,500 boats monthly.

The oldest employee in point of service, Captain Victor Sandras has been with the Division of Oysters and Water Bottoms as Captain of the patrol boat "Louisiana," since 1905.

It is also recommended that control and operation of the locks both at Empire and Ostrica be transferred from this Department to the Department of Public Works.

SEISMIC SECTION

During the years 1944 and 1945 the Seismic Section of the Division of Oysters and Water Bottoms continued its expansion due to the increased efforts on the part of the oil companies in their search for new petroleum reserves. This intensified search made it necessary to hire more agents than had been employed at any previous time to properly protect the oysters, fish, shrimp and wild life of the State. It was found that the set of rules and regulations drawn up in May, 1941, was quite adequate and covered all normal situations that arose. No change in these regulations is anticipated at the present time.

After the marked decline in exploration at the outset of the late war and the slow but gradual increase in operations during 1942 and 1943, the number of seismograph crews in the State reached a new high in 1944 and again in 1945. The two highest months for 1944 were January and June. During each month there were forty-seven seismic agents working with crews throughout the State. The monthly average for 1944 was forty-five agents on the job. Each of these agents worked an average of nine months out of the year. In 1945 the monthly average increased to forty-seven agents, October and November being the highest months with fifty-one agents on the job. Once again the average time work was nine months per agent.

During 1944 a total of 356 new permits were issued for seismic operations as compared with 302 permits for 1943. In 1945 the number of new permits increased to 370. Thus it is clearly seen that the year 1945 from the standpoint of the number of crews operating in the State, the number of seismic agents employed and the number of new permits issued was the most active of any period since the inauguration of the Seismic Section. The increased tempo of seismic exploration has necessitated additional routine and supervisory work.

In many cases exploration was conducted in important oyster and fish areas. All difficulties arising due to the overlapping of the petroleum and fish industries were settled to the satisfaction of all parties. The oil companies have put forth every effort to cooperate with the Department in preserving our fish and wild life.

During the month of September, 1945, the monthly report to the U. S. Bureau of Mines giving the location of crews operating in the State was discontinued, the Bureau of Mines having no further use for such a report after the termination of the war.

Studies concerning the ground effects of dynamite in relation to the natural resources of the State were continued in 1944 and 1945. This program was inaugurated in 1943. The results of such experiments have been most valuable in assisting in the conservation of our natural resources.

Since its inception in 1939, the Seismic Section has offered continuous protection to our fishermen and has done much to increase friendly relations between the fishermen and the oil companies.

DIVISION OF RESEARCH AND STATISTICS

LOUIS CUSACHS, *Director*

CUSACHS

As in the previous biennium the activities of this Division have been restricted to stream pollution and waste disposal inspections and investigations. With the transfer of this Division into the Department of Wild Life and Fisheries in December 1944 much needed administrative support was obtained. Since budgetary appropriations for the period under review were based on the severely curtailed funds during the previous biennium, the Division is still inadequately staffed to afford statewide coverage and continuity in any phase of divisional activity.

Efforts are made to inspect the major waste disposal systems and affected streams with some degree of regularity. Two field men, with the director and the biologist, attempt to do this work as well as special field investigations and inspections of pollution cases, which are reported by individuals, public officials and other state agencies.

A full time field man was placed in the Lake Charles area in May 1943 primarily to inspect oil fields and rice irrigating water supplies in the area. Also the discharge of oil field waters, accumulated during the rice irrigating season, had caused some fish mortality. The several oil loading docks and storage terminals had been the cause of oil pollution on the Calcasieu River proper. During the current biennium this field man has been able to undertake the inspection of the waste disposal systems of most units in this now highly industrialized area, has cooperated with some of the technical staffs of these industries in improving waste disposal practices, has with the cooperation, of the manager and personnel of the Minerals District Office, Department of Conservation, brought oil field waste disposal under reasonably good control; has worked with agents of the Enforcement Division, Department of Wild Life and Fisheries, in matters pertaining to stream conditions; and has undertaken the supervision of all waste disposal systems in six parishes with very little direction from the office.

Until October 1944 the biologist made regular monthly trips to North Louisiana, i.e. north of Alexandria, in an effort to keep some watch over the important waste disposal systems in that area, to make special investigations when necessary, in addition to his regular duties in the biological laboratory in Baton Rouge, such as toxicity tests of industrial wastes. A field man was engaged, trained and assigned to North Louisiana in October 1944. This does not represent a numerical addition to the divisional staff since the death of the former director, some months before with the writer's taking over the position of director, had resulted in a reduction of the staff. With occasional trips of the biologist and director in the area long existing problems were investigated more thoroughly and a better knowledge of stream conditions in that area is possessed now. Data have been obtained for the solution of some problems, but the size of the territory involved, lengths of streams affected by wastes, and the diversity of wastes, are too great for any one person to handle with any degree of success. Prompt investigation of several stream pollution cases were made possible, with a greater degree of direct contact with the industries which discharge wastes into public streams. During the winter months the four pulp and paper manufacturing units in the area discharge accumulated wastes. A check of stream conditions, sufficient to support fish life, must be made during these periods of waste discharge. During the dry Summer months it is necessary to prevent the discharge of any appreciable amount of wastes into most of the streams in North Louisiana for the protection of fish life. The present situation is one of checking with greater regularity, over as wide a territory as possible, with little time to devote to concentrated efforts toward further stream improvement.

Much difficulty was experienced with impairment, of operations of sanitary sewage treating plants, and of some streams from the disposal of sweet potato dehydrating wastes. In cooperation with the Division of Public Health Engineering State Department of Health and with officials of communities affected the writer and the chemist devoted several months in appraising the nature and effect of these wastes on sewage treating plants and receiving waters. Most of the difficulty was encountered in the Opelousas-Lafayette-New Iberia area. Immediate temporary remedial measures were made, and a program to study and establish permanent unobjectionable means, for the disposal of such wastes, was developed. Vegetable oil wastes were likewise studied. For the first time a rather complete appraisal of the pollutional strengths of representative sugar factory wastes was made in this laboratory. The pollutional strength of putrescible wastes from a single manufacturing unit is in general greater than that of the total sanitary sewage from all communities along the receiving stream. Considerable work in the chemical laboratory has been made possible by the return of a full time lady chemist.

Although other causes of pollution are suspected by persons who reported the fish mortality, oxygen deficiency primarily from natural causes was observed in the early Autumn, of 1944 in the closed ends of streams which are now cut off from the Atchafalaya River below Krotz Springs, and of 1945 in False River, Cane River Lake, Wurkenger Bayou and Horseshoe Lake; with the death of fish reported, but not investigated, at the same time in the Morganza Spillway. It is believed that these occurrences are due to the Fall overturn, or mixing of oxygen deficient bottom layer of water with the surface water, the temperature of which has been reduced by the air to the temperature of the bottom layer of water. The oxygen depletion of the bottom layer of water is due to the decomposition of vegetative debris, from the fallen foliage of trees or shrubs along the banks or shores of the bodies of water, or from submerged aquatic vegetation. In bodies of water of some fourteen or more feet in depth, in the absence of flow, or active wave action, i.e. in the absence of some regular motion of the bottom layer of water, oxygen depletion in the bottom water is likely to occur. Near Rodessa, in Caddo Parish, an investigation of Black Bayou, disclosed oxygen depleted acid water as the cause of fish mortality. The evidence indicated swamp water as the source of this pollution. No identifiable oil field wastes were found in the stream at the time of investigation.

Other streams or bodies of water which required special investigation: Caddo Lake, Bayous Fountaine and Manchac, Bayou Tigre (Iberville Parish), Tchefuncta River and Miles Branch, Bayou Lafourche and Little Lake Lafourche (Morehouse, Richland, Ouachita and Caldwell Parishes), upper Ouachita below Arkansas boundary, Bayous duLac and Des Glaises, Grand Bayou (Assumption Parish), Bayou Grosse Tete, Clear Creek, Bayou Bonfouca, Bayou Grand Caillou (Terrebonne Parish), Bayou Terrebonne, Bayou Teche.

In addition to the salt water problem in the Calcasieu River, the progressive downstream increase in temperature along the stretch of River on which the industries are located requires attention. Water for cooling, withdrawn by the industries from the River, is returned to the River at progressively higher temperatures. The comparatively high temperatures of the surface water (above 90 degrees Fahrenheit) immediately below the industrial area has established a barrier unsuitable for fish life. After the ship channel to the Gulf was opened in 1941, salt water fish were caught in Prien Lake below Lake Charles. Problems likely to occur in streams alternately salty and fresh: following the protracted dry weather and high Gulf tides in 1943, heavy rains in the early part of 1944 freshened the River to such an extent that speckled trout were killed in large numbers in Calcasieu Lake.

To cover recent developments in waste disposal practices and to approach pollution problems according to types of industry, this Division since 1940 has been dealing with representative groups from several kinds of industries. During the biennium, groups representing food processing units and petroleum refineries were added. Some overall phases of this activity will be covered in the report of the Louisiana Stream Control Commission.

PULP AND PAPER

A national council for stream improvement was formed by pulp, paper, newsprint, and paper board manufacturers. Southern regional meetings were held in New Orleans in 1944, and in Savannah, Georgia, in 1945. Activities sponsored and financed by the national council are for multiple fellowships on by-product recovery from, and waste treatment of, pulp and paper mill wastes, compilation and dissemination of waste disposal data, coordination of all work on pulp and paper wastes and waste disposal, and the engaging of consulting specialists in the fields of waste treatment and stream pollution.

The local state pulp and paper group held one meeting with the Stream Control Commission, and it has been suggested that pulp and paper mills in adjoining states be invited to meet and work with the local group. The stream control agencies in the adjoining states will also be asked to take part in the meetings.

Three definite cases of stream pollution from pulp and paper mill wastes occurred during the biennium. Bayou Lafourche and Little Lake Lafourche were affected in 1944. Corrective steps were taken by the manufacturing units in Bastrop and no recurrence of pollution is anticipated. Pollution of Bodcau Bayou for several years has been the subject of much bitter controversy. The owners of the Springhill mill, the manufacturing unit involved, have submitted recently copies of orders, accepted by dealers for equipment to remove two-thirds of the pollutional strength of the wastes, with cost figures. The construction of a flood control dam below the mill in the near future will tend to accentuate the effects of the factory wastes in the Bayou Bodcau above the proposed dam.

No complaints of the pollution of the Ouachita River below Monroe were received. Fish mortality were twice reported and investigated above Monroe. In one instance oil field salt water waste, and in the other paper mill waste from above the Arkansas line, were found to be responsible. In this connection the fine spirit of cooperation of the Arkansas officials is to be commended.

Dugdemona Bayou, as influenced by the wastes from the paper mill at Hodge, has gone through cycles of extreme high and low water stages without any reported fish mortality.

Apparently satisfactory control over the wastes from the Elizabeth Paper Mill is observed, as is verified with some regularity by a divisional field man.

One investigation of Pearl River below the paper mill at Bogalusa failed to reveal stream conditions definitely detrimental to fish life. In view of some repeated complaints, regular complete investigations, which require more personnel than is now at the disposal of the Division, are needed.

Sugar Factories. The seasonal ten to twelve week sugar cane grinding season has made close observation of factory waste disposal and stream conditions over the whole sugar area impossible. In general, several mills are located along the same stream or utilize the same drainage system. The cooperation by the industry, as exemplified by the Pollution Abatement Committee of the American Sugar Cane League, has been more gratifying than the cooperation by most individual mill owners. The effectiveness of the following proposals, already taken up with the mill operators, depends upon the cooperation of these mill operators and the number and regularity of contacts this Division can maintain.

Five mills in the drainage basin of Bayou Choctaw-Grosse Tete-Plaquemine-Grand River have promised to pump their wastes into the Mississippi River. The wastes are essentially putrescible and will appear in inappreciable concentration in the Mississippi River water.

Two mills discharging waste waters into the swampy area drained by Bayous Daniel and Tigre will have to keep all wastes from entering these streams. Regular pollution of these streams has occurred during the grinding season, and the distance the wastes have to travel to the receiving streams is insufficient to provide any correction of the mill waste waters.

Pollution problems exist from the wastes of some of the factories along both the upper and lower banks of Bayou

Lafourche (Ascension, Assumption and Lafourche Parishes.) The Savoie operated mills, Lula and Westfield, discharge their wastes into leveed privately owned swamps. Some of the other mill owners with privately owned swamps can do likewise, others will have to exercise stricter control over their wastes, and if necessary make provisions to keep all wastes from entering the present receiving waters.

During the 1944 grinding season diversion of water from Bayou Teche through Ruth Canal was stopped. Some raw sewage from New Iberia and the condenser water from seven factories were discharged into the Bayou without serious pollution of that stretch of the Teche. It is to be noted that raw sewage from the City of Lafayette with the wastes from two sweet potato drying plants in Lafayette resulted in heavy fish mortality in Bayou Vermilion, into which Ruth Canal normally discharges water from Bayou Teche-Bayou Courtableau. In 1945, following a rain, fish killing took place in Bayou Teche below New Iberia. Extremely low water stage with corresponding too great a load of putrescible wastes in the ascribable cause. Accumulated trash and sour sugar cane debris on the mill yard has been determined as having an extremely high pollutional strength; the flushing of this material into the Bayou by rains is objectionable. The city of New Iberia is completing provisions not to discharge any raw sewage into the Bayou. All the mills in the area will have to take further steps to lighten the pollutional load of their wastes going into the Bayou. Waste disposal from the factory at Franklin is being studied and plans are being made to prevent the pollution of Bayou Yokely and Franklin Canal from the factory wastes.

Pollution of Chatlin Lake Canal-Bayou duLac, from wastes in the Alexandria area, is extended into Bayou DesGlaises during the operation of the sugar factory at Meeker. This pollution, which has been difficult to trace, has become more severe within the last three years due to the redirection of drainage occasioned by the construction of the MacArthur Highway, and work done on some tributary streams, i.e. Bayou Boeuf and Bayou Lamourie.

Deepening and cleaning Bayou Tigre (Vermilion Parish) before the 1944 grinding season might reduce appreciably the pollution of this Bayou by waste from the mill at Erath. This year killing of fish was reported at the time the divisional biologist had resigned and the pressure of other work prevented the writer from investigating this complaint. This pollution has gone on for years and definite remedial steps at the mill are overdue.

Lack of personnel, and material unavailable during the war, have been legitimate excuses in some, but not in all cases of failure to provide efficient control over, or proper disposal of, factory wastes. A greater sense of responsibility for the proper care of sugar factory wastes by mill operators is very much to be desired.

Petroleum Production (Oil Field Operation). It is believed that definite improvement in field operations to prevent harmful pollution will result from the attitude of the majority of the oil producing companies represented on statewide and district committees. To be cited especially is the Shreveport District Committee which is exerting the full influence of the industry to obtain adherence to the best field practices in drilling for, and producing of, oil.

Three complaints against careless drilling operations were reported during the biennium. Several cases of oil pollution were reported, most of them were investigated with prompt regulatory compliance by the operators. Some accidental spillage of oil, with corrective measures taken, were reported by some of the operators themselves.

Some improvement has been made in Bellevue Field in regard to oil waste, but further improvement is still necessary.

Tullos-Urania Field is, and has been for years, an eyesore in respect to waste oil. The oil reserves in this field are practically depleted, and production is not under allotment, so that no inspections by the Conservation Department are made. Larger amounts of salt water in this field and others in the same drainage area are now being produced and run to waste in fresh water streams. If this condition is allowed to continue Bayou Castor-Little River are bound to be affected, and eventually Catahoula Lake. Systematic surveys of the drainage system during high and low water stages are necessary.

The shallower oil sands in University Field (East Baton Rouge Parish) are producing excessive salt water in relation to the fresh water flow in Bayous Fountaine and Manchac during dry weather. The discovery of a deeper oil formation suggests that the some shallower wells should not be abandoned, but kept to dispose of the salt water to appear in time from the deeper oil sand.

Although reports have been received on some other fields no investigations have yet been made.

Information is needed on stream conditions serving to receive waste oil field waters. In many cases subsurface disposal of waste waters is being accomplished. Data on the feasibility of this practice in all cases are lacking. Few operators will voluntarily choose such method of water disposal. Salt water production increases at unpredictable rates during the life of an oil field.

The development of oil production in this state has increased to such an extent that if it were not for much help from the six Minerals Division District Offices, of the Department of Conservation, oil field waste disposal could not be covered with any degree of effectiveness by this Division.

FOOD PROCESSING PLANTS

With the starting of large scale sweet potato plant dehydrating operations, large volumes of highly putrescible wastes were produced. Permanent provisions for proper waste disposal, in some cases, await postwar development in this industry.

During low water stage in the stream Bayou Terrebonne receives so much waste from the packing plants along its banks that oxygen depletion and odor nuisance develop. An attempt is being made to get all plant operators to work together in providing suitable waste disposal facilities; individual waste treating units would be more costly to each operator than a central unit serving all plants.

A pepper sauce and food products company in St. Martinville, after disorganizing the operation of the city sewage plant, trying other means of waste disposal, and finally dumping raw wastes into open drainage ditches and canals, has exhausted all other means than treating the wastes at the plant site before discharge. The operators of the plant are studying the problem and are to submit plans for suitable treatment of the wastes.

Miscellaneous work in the field and in the laboratory were performed on meat packing and other wastes. Now that the war is over, a recession of such plant operations from peak war time levels is anticipated with a decrease in the volume, if not the strength the trade wastes.

Some milk bottling plants are being planned. Milk, like other excellent foods, is highly putrescible and milk wastes have high pollutional strengths. Unless the wastes are properly cared for harmful effects of such wastes on small, or on slow moving streams, are likely to result.

Petroleum Refineries. Regular meetings with technical personnel from the major petroleum refining units in the State were started a year ago. Exchange of information and ideas within the group has been mutually helpful, and has held the interest of all those attending the bimonthly meetings. Plans to improve the waste disposal systems in all refineries have been or are being made. Three of the largest units have designated special technical men, who devote all or most of their time to the waste disposal systems. Problems have been discussed; the establishing of fellowships, to determine the immediate and cumulative effects of refinery wastes on fishes, has been proposed and practically agreed upon. The final solution of some waste disposal problems await the data to be obtained under these fellowships. This move by the group is highly constructive and will make available scientific information which has been lacking heretofore.

With arrangements for Stream Control Commission meetings, hearings, field, laboratory and routine administrative work, insufficient time has been devoted to gatherings with these industrial groups. More ready compliance to stream and waste disposal regulations, as well as constructive interest and support, can be obtained by open discussions with industrial interests which produce and have wastes to be disposed of.

Pine Products. Units in Covington and Alexandria were involved in the pollution of small or slow moving streams. Data have been obtained in the field and in the laboratory to indicate that these two units can dispose of their wastes into nearby larger streams, rivers, with little danger of harm to fish or to the rivers.

Creosoting Plants. Necessity for improving the waste disposal system at a plant in Winnfield was taken up with the management. Investigation was made also of a plant in the Alexandria area.

Naval stores. No complaints were received during the biennium of pollution from naval stores plants. Two new large units are to be constructed, one at DeRidder and the other at Oakdale. The owners of the proposed plants have been contacted in regard to the proper disposal of the plant wastes.

Synthetic Rubber Plants. Bayou D'Inde in Calcasieu Parish is a normally sluggish stream. Raw sewage from Sulphur, wastes from hurriedly started plant operations and accidental discharges of wastes, from a synthetic rubber factory and a butadiene plant, created objectionable conditions in the Bayou. A survey of the Bayou, which utilized every available male employee of this Division and chemists from the plants involved from a day to two weeks, enabled the working out of corrective measures. Complete revision of the disposal systems at these plants followed, with the work now completed.

Two instances of pollution by alcohol (molasses) distilleries were reported from the west bank of the Mississippi River in Jefferson Parish. Demands for more careful control over the discharge of wastes from these plants have been made to the respective managements.

No complaints have been received on wastes from rendering plants, which caused trouble during the previous biennium.

In the matter of hog lot waste, the condition appears materially improved.

Rice irrigating water. Some test stations are supplied with reagents to determine the salt concentration in water used to irrigate rice. Standard salt solution, with which to check the test reagents, is supplied in the rice area at the beginning of the rice growing season. Salt in irrigation water is a more serious problem in the Calcasieu area than to the east of it. This Division tried in the past to get all rice irrigators to test the water of the streams for salt during the whole year. For lack of funds and personnel the Division has been unsuccessful in this effort except for a few instances in the Calcasieu area. Besides the physiological effect of salt water on the rice plant itself, some effect on the soil is probable. Conflicting requirements of water for navigation, rice irrigation, and as habitats for fresh water fishes, will continue to impose serious problems, unless future water developments take all of these phases of water use into consideration.

Data. Calcasieu River. Insufficient facilities for the necessary direct observations on stream conditions have obliged this division to resort to indirect methods. The available data have been assembled and presented in graphical form. Early salinity values and all tidal gage readings were furnished by the courtesy of the U. S. District Engineer, War Department, in New Orleans; the rainfall reports, through the kindness of the U. S. Weather Bureau; other salinity figures by the Calcasieu Salt Water Survey, a cooperative project of agricultural, oil field, and manufacturing interests and the Lake Charles Association of Commerce. Final compilations, calculations, and graphical work, were made by the Bureau of Business Research of Louisiana State University. In addition to gaps in all the data, some values were available only for weekly periods, hence the necessity to reduce all data to that time element. It was desirable to have data for a station immediately below the city of Lake Charles; continuity of data for such a station was missing and a station above Lake Charles, on the channel was taken instead. It is intended to prepare later the calculated contributions of salt from different sources to the Calcasieu River water, from samples collected weekly by members of the Calcasieu Salt Water Survey group, and analyzed under a cooperative agreement with this Division by the Water Quality Division of the U. S. Geological Survey Laboratory in Austin, Texas.

It is hoped that tests which have been and which are to be made on the Calcasieu River model at the U. S. Waterways Experiment Station at Vicksburg will furnish information, on the past and present salinity conditions of the River, and for some solution for Gulf water intrusion. Other sources of salt water could then be determined more readily.

All chemical analyses in following data were performed by Mrs. M. T. Carney, Divisional Chemist. All B.O.D. (Biochemical Oxygen Demand) determinations were made at 20°C.

Data, Sugar Factory Wastes. Samples, by cooperation of Louisiana State University Engineering Experiment Station and Department of Chemical Engineering, from University Experimental Sugar Factory.

Regular Waste	5-Day B.O.D. p.p.m.	B.O.D. lbs./day	B.O.D. lbs./ton cane
Mill Wash Water	17,500	66	0.55
Filter Cake (solids)*	206,000	382	3 23
Filter Cloth Wash Water	26,000	49	0.41
Condenser Water	21	138	1.17
		635	5.36

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* Determinations based on total solids by drying @ 105°C.

Biweekly Cleaning Waste	pH	5-Day B.O.D. p.p.m.	lbs.	B O.D. lbs./ton cane*
Wash Water Effects	7.3	1,480	1.85	0.0028
Caustic Rince Water	10.2—11.4	82	0.31	0.0005
Acid Waste Water	1.3	1,050	7.52	0.0120
Acid Rinse Water	2.2— 2.9	200	0 75	0.0012
			10.43	0.0165

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* Based on total cane ground during biweekly period.

Sanitary sewage has 0.12—0.16 lb. B.O.D. per capita per day. B.O.D. of raw sanitary sewage, 96 to 412 p.p.m.

Agreement made with Pollution Abatement Committee, of American Sugar Cane League, in 1941 that only condenser water should be allowed to flow from sugar factories into public streams. Other wastes to be impounded.

Samples submitted to laboratory from sugar factories:

Sample	5-Day B.O.D. p.p.m.
Condenser Water	up to 165
Condensate from Calandrias of Effects	up to 1,030
Surface Drainage (runoff) from Mill Yard Passing Near Shredded Cane	3,300
Various Streams Polluted by Factory Wastes	up to 200

Data, Pine Products Wastes. Plant process destructive distillation of pine wood or stumps.

Wastes From	Plant A	Plant B*
pH	2.5	2.8
Normality of Acid	0.24	0.33
Oxygen demand (O.D.)	23,760 p.p.m.	36,400
Immediate B.O.D.	1,290 p.p m.	....
5-Day B.O.D.	34,500 p.p.m.	....

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* Limit of tolerance of fishes (bluegill sunfish) to waste in concentration of 0.12% (12 parts to 10,000 parts of dilution water) 24 hrs. exposure, and less than 0.10% (10 parts per 10,000 of dilution water) for prolonged exposure. One gallon of waste to 1,000 gallons of stream water can be harmful to fish life (Dr. Doudoroff, Divisional Biologist).

Condition of Drainage Canal	Without Waste	With Waste (Plant A)
pH	7.8	5.5
Dissolved oxygen (D.O) p.p.m.	1.8	0.0
Oxygen demand (O.D.) p.p.m.	19	1,119

Data. Sweet Potato Dehydrating Wastes.

	Wash Water	Lye Peeling Liquor
pH	10.9	12 (in 1:40 dilution)
Solids, Settleable, ½ hr. ml/1	129	....
Solids, Settleable, 2 hrs.	129	....
Solids Total, p.p.m.	15,890	456,600
Solids Fixed	3,340	411,400
Solids Volatile	12,550	45,200
Oxygen demand p.p.m.	3,990	54,000
B.O.D. Immediate p.p.m.	66	1,370*
B.O.D. 1-day	1,320	1,580*
B.O.D. 3-day	6,400	1,600*
B.O.D. 5-day	6,700	2,250*
B.O.D. 10-day	7,000	71,000
B O.D. 15-day	7,000	73,800
B.O.D. 25-day	7,000	77,400
Population Equivalent	40,200	....

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* Low values due apparently to inhibitory action of wastes, at these dilutions.

Tests of activated sludge sewage treating plants with and without sweet potato waste.

	5-Day B.O.D. p.p.m. Without Waste	5-Day B.O.D. p.p.m. With Waste
Sewage	75	510
Primary settling chamber	40	400
Aeration chamber	27	180
Effluent	6	78

Effect of wastes from two sweet potato dehydrating plants, waste (1 and 2) and meat packing plant wastes (3) on receiving stream.

	5-Day B.O.D. p.p.m.
Stream above plants	3
1. wastes (lye peel process)	5200
Downstream from 1	10
2. wastes (steam peel process)	5220
3. wastes	750
Stream below 1, 2, & 3	19

Meat Packing Plant Wastes.

	Wastes From Meat Packing	Wastes From Killing and Butchering
pH	8.2	7.6
Solids, Settleable ½ hr. ml/l	7	4
Solids Settleable 2 hrs. ml/l	7	5
Solids Total Soluble, p.p.m.	1940	1930
Solids Fixed Soluble	310	290
Solids, Volatile Soluble	1630	1640
Oxygen Demand, p.p.m.	92	64
B.O.D. Immediate p p.m.	20	14
B.O.D. 1-day	160	310
B.O.D. 3-day	1350	630
B.O.D. 5-day	1830	660
B.O.D. 10-day	3010	1290
B.O.D. 15-day	3000	1800
B.O.D. 25-day	3000	2500
Population Equivalent	55	23

Soap Plant Wastes.

	Waste No. 1	Waste No. 2	Waste No. 3	Waste No. 4
pH	10.6	6.2	9.1	9.2
Solids Settleable ml/l ½ hr.	234	888	57	156
Solids Settleable ml/l 2 hr.	205	694	46	124
Solids Settleable p.p m.	5,350		2,420	6,080
Solids Suspended p.p.m.	16,700	22,680	193,200	145,600
Fat p.p m.	2,620		27,210	
*Solids, Soluble p.p.m.	174,950	91,010	222,780	151,720
Solids Fixed p.p.m.	162,200	34,420	154,220	108,730
Solids Volatile p.p.m.	12,750	56,590	68,560	42,990
Oxygen demand	3,150	4,960	6,730	14,640
B.O.D. Immediate p.p.m.	82	36	79	58
B.O.D. 1-day	105	12,600	480	1,340
B.O.D. 3-day		16,620	18,240	15,120
B.O.D. 5-day	3,240	19,020	26,400	29,550
B.O.D. 10-day	5,030	24,000	30,750	32,250
B.O.D. 15-day	5,340	27,900	42,150	38,100
B.O.D. 25-day	5,610	30,900	42,150	38,100
Population Equivalent	194	84	346	598

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* This test and all those listed below it were made on samples with soluble material only.

Vegetable Oil Refinery Wastes.

	Waste No.			
	1	2	3	4
pH	11.1	8.4	0.6	1.1
Solids, Settleable, ½ hr. ml/1	....	....	9	....
Solids, Settleable, 2 hrs. ml/1	....	....	36	....
Solids, Settleable p.p.m	....	....	10,160	....
Solids, Suspended, p.p.m	3,500	....	325,540	....
*Solids, Soluble, p.p.m.	11,240	320	335,700	503,900
Solids Fixed	1,880	274	162,160	92,970
Solids Volatile	9,360	46	173,540	410,930
Oxygen Demand p.p.m.	3,200	3	41,330	44,710
B.O.D. Immediate p.p.m.	32	3	122	121
B.O.D. 1-day	164	4	480	330
B.O.D. 3-day	5,805	4	59,250	54,600
B.O.D. 5-day	6,920	4	82,500	78,450
B.O.D. 10-day	7,000	5	115,800	98,400
B.O.D. 15-day	7,000	10	137,000	151,000
B.O.D. 25-day	8,100	11	148,000	151,000
Population Equivalent	704	....	2,780	734

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* This and determinations listed below it made on sample with soluble material only.

SUMMARY AND CONCLUSIONS

Notwithstanding the help and cooperation extended by the Commissioner, and by the Enforcement and other divisions, of the Department of Wild Life and Fisheries, the Minerals Division of the Department of Conservation, the Department of Health, and other agencies, this Division finds itself confronted regularly with old and new waste disposal and stream pollution problems. This condition is largely the result of the original severe curtailment of funds during the 1942-1944 biennium. Water developments in, and increased industrialization of this State are continually posing new problems to contend with. To satisfy the criticisms of those who want immediate legal prosecution in cases of stream pollution, a police force of sufficient size to cover the State and to obtain evidence in such cases would be required with changes in the present laws. Special training would have to be provided for the men on such a force to obtain immediate valid evidence, as such evidence is lost often within minutes or hours by the pollutants becoming diluted and carried downstream. Dealing only with representative groups of industries is a help but, according to past experience, does not result in the stopping of stream pollution. Enough field men to inspect regularly waste disposal systems and receiving streams, with direct frequent contacts with individual industries and industrial groups would be of less expense to the State, and might offer early progressive improvements in the more objectionable types of stream pollution, and a final control over all waste disposal systems and stream pollution. Proponents of the argument for more, and more widespread industrialization in this State, with little or no control over the streams and without correspondingly greater support for wildlife and conservation activities in this State, are creating an issue which will eventually work against these proponents. The necessity for corrective measures is realized usually after a situation has become aggravated. Although the present laws express the intent to stop stream pollution, inadequate provisions are made in the law to permit the attainment of the objective.